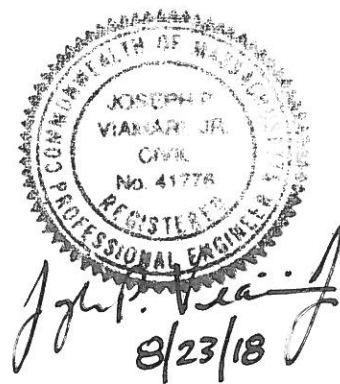
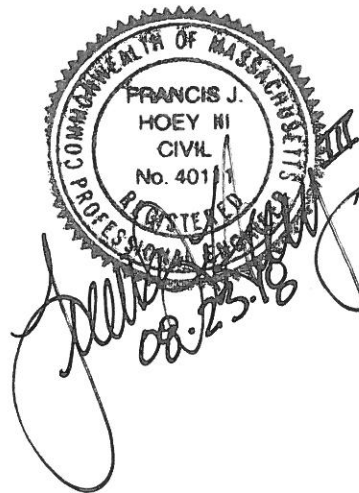


Theater Park and Parking Lot Redevelopment Project #2019-315

City of Gardner, Massachusetts

August 2018



Tighe & Bond

53 Southampton Road
Westfield, MA 01085

**Theater Park and Parking Lot Redevelopment
City of Gardner, MA
Gardner, MA
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DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS

SECTION 00100

ADVERTISEMENT FOR BIDS

CITY OF GARDNER
DEPARTMENT OF COMMUNITY DEVELOPMENT AND PLANNING

INVITATION TO BID

The City of Gardner, acting herein through the City of Gardner's Department of Community Development and Planning (DCDP), is soliciting bids for the construction Theater Park and Parking Lot Redevelopment Project at 32 Parker Street, Gardner, MA. Sealed general bids will be received at the office of the DCDP, Manca Annex – Room 202, 115 Pleasant Street, Gardner, MA 01440, until 2:00 p.m., Sept. 19th, 2018, at which time and place said bids shall be publicly opened and read. Envelopes containing proposals should be clearly marked on the outside:

BID FOR THEATER PARK AND PARKING LOT REDEVELOPMENT PROJECT

The project includes furnishing all labor, equipment and materials required to complete the Theater Park and Parking Lot Redevelopment Project. The project includes, but is not limited to, selective demolition, earthwork, parking lots, sidewalks, site lighting, and other work, appurtenances, and incidental items as set forth in the contract documents.

All bids for this project are subject to the precisions of Massachusetts General Laws Chapter 30, Section 39M, as amended.

Complete project information, plans, specifications and proposal forms may be obtained at the DCDP beginning August 22th, 2018 between the hours of 8:00 a.m. and 4:00 p.m., Monday through Thursday and between 8:00 a.m. and 12:30 p.m. Friday. A \$50 document deposit, in the form of a business check payable to the City of Gardner, is required for the plans and specifications. Such deposit shall be refunded to bidders who return plans and specifications, in usable condition, within ten days following bid opening. Bidders requesting mailed document sets must provide a non-refundable \$30 mailing fee in the form of a separate check payable to the City of Gardner. **Plans and Specifications are available electronically at no charge. Visit www.gardner-ma.gov for more details.**

A voluntary pre-bid meeting will be held on Thursday, September 6th, 2018 at 2:00 pm on site at 32 Parker Street to view existing conditions prior to bidding.

Minimum Wage Rates as determined by the Commissioner of Department of Labor and Workforce Development under the provision of the Massachusetts General Laws, Chapter 149, Sections 26 to 27D, as amended, and federal Davis-Bacon wage decisions apply to this project. It is the responsibility of the contractor, before bid opening, to request if necessary, any additional information on Minimum Wage Rates for those trades people who may be employed for the proposed work under this contract. Bidders are required to comply with the greater of federal Davis-Bacon wage decisions or state minimum wage schedules as established by the Commissioner of Department of Labor and Workforce Development.

Bid security in the form of a bid bond, certified or cashier's check, payable to the City of Gardner, is required in a dollar amount of not less than five percent (5%) of the total bid amount. A performance bond and labor and materials bond for 100% of the total contract price, issued by a satisfactory surety company shall be required by the successful bidder.

The City of Gardner reserves the right to reject any and all bids, to accept proposals deemed to be in the best interest of the City, and to waive any informalities or irregularities in the bids received. Bids may not be withdrawn within 30 days of the bid opening.

CITY OF GARDNER

Dept. of Community Development and Planning

By: Joshua Cormier, Assistant Director

INVITATION TO BID

00100-2

SECTION 00200

INSTRUCTIONS TO BIDDERS

CITY OF GARDNER
DEPARTMENT OF COMMUNITY DEVELOPMENT AND PLANNING
INFORMATION FOR BIDDERS

1 Project Site

The Project is the Theater Park and Parking Lot Redevelopment Project, located at 32 Parker Street, Gardner, Worcester County, Massachusetts.

2 Inspection of Site

By submitting a bid, the Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to the conformation and conditions of the ground; the immediate and adjacent environs; access and egress; local ordinances, policies and regulations; and the identification of any discrepancies in the contract documents affecting the contract bid price, all as a result of a pre-bid visit and careful review of the bid documents.

Any failure of the Contractor to take the actions described and acknowledged in this paragraph shall not relieve the Contractor from responsibility for properly estimating the difficulty and cost of successfully performing all work in accordance with the Contract Documents without additional cost to the City of Gardner Redevelopment Authority (hereinafter Owner, or City, or Awarding Authority).

The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor based upon the information made available by the Owner.

3 Prequalification Statements

In accordance with the City of Gardner's requirements, prospective bidders must complete and submit a Qualification Statement for this project. Qualification forms are included in Section 00410.

4. Bid Deposit

All proposals must be accompanied by a bid deposit in the amount of five percent (5%) of the value of the bid, and shall be in the form of a bid bond, or a certified or cashier's check issued by a responsible bank or trust company, payable to the City of Gardner, in the name of which the Contract for work is executed. Bid bonds shall be (a) in a form satisfactory to the City, (b) with a surety company qualified to do business in the Commonwealth and satisfactory to the City, and (c) conditioned upon the faithful performance by the principal of the agreements contained in the bid. The bid deposit must be enclosed in the same envelope with the proposal.

Bid deposits will be returned to respective bidders within five (5) working days after proposals are opened; except those of the three (3) lowest responsible and eligible general bidders, which the City will hold until the successful bidder has executed the Contract. Thereafter, all remaining deposits, including that of the successful bidder, will be returned upon the expiration of the time prescribed for making an award. See applicable provisions of MGL c. 30 § 39M, and/or MGL c. 149 § 44B, which may apply.

5 Award of Contract

The Notice of Award of a Contract, after approval by the awarding authority, shall be within thirty (30) days, Saturdays, Sundays and legal holidays excluded, and shall be in written form signed by the DCDP Assistant Director. The notice shall bind the successful bidder to execute the Contract and furnish Performance and Payment bonds, and be responsible for liquidated damages provided in the General Conditions. The rights and obligations provided by the Contract shall become effective and binding upon the parties only upon formal execution. See applicable provisions of MGL c. 149 § 44A-H, and/or MGL c. 149 § 29, which may apply.

6. Time for Executing Contract and Liquidated Damages for Failure to Execute

The successful bidder shall execute and deliver to the Owner of the Contract, and all required Bonds and insurance certifications, within ten (10) days of receipt of Notice of Award. Failure or refusal of the successful bidder to execute and deliver the Contract and Bonds required within ten (10) days shall result in forfeiture of the bid deposit to the Owner as liquidated damages for such failure or refusal. The bid deposit shall become the property of the Owner for liquidated damages provided the amount of bid deposit does not exceed the difference between bid price and bid price of next lowest responsible bidder; and provided further that, in case of death, disability, bona fide clerical or mechanical error of a substantial nature, or other similar unforeseen circumstances affecting the general bidder, in the opinion of the Owner, said bid deposit shall be returned to such bidder.

7 Prices

In the event of discrepancy between the prices quoted in the proposal in words and those quoted in figures, the words shall control. The prices are to include the furnishing of all materials, plant, equipment, tools and other facilities, and the performance of all labor services necessary or proper for the completion of the work, including all delivery and/or freight costs FOB work site.

8. Sales Tax Exemption

The City of Gardner is exempt from State Sales Tax under the Sales Act, Chapter 14 of the Acts of 1966 and all amendments thereto. All purchases of supplies and materials in relation to the project are therefore exempt. This should be considered when forming contract prices. The City of Gardner Tax Exempt Number is E-046-001-389.

9. All Contracts Subject to Appropriation

The execution of a Contract is subject to adequate financial appropriation for the Project as advertised. The lack of adequate financial appropriation by the Owner, or granting agency, for the Project shall constitute grounds to reject all bids, or those bids which exceed the financial limitations imposed by the Owner.

10. Changes in Quantities of Work

- A. Site Conditions – MGL c. 30, § 39N is incorporated herein and made a part of this Contract to the extent required by law.
- B. Quantities – The City reserves the right to modify the scope of work including, but not limited to, estimated quantities, provided that the total price for all such modifications does not exceed 25% of the total Contract price, or as otherwise required by law.

The Contract shall be awarded to the lowest eligible and responsible bidder. The lowest bidder shall be the bidder with the lowest base bid plus a total of the alternates, if included in the project, selected by the Owner in the order presented.

11. Addenda

If it becomes necessary to revise any part of this Invitation to Bid or if additional data are necessary to enable an exact interpretation of provisions, such addenda will be provided to all bidders who have requested the bid documents. No addenda will be issued within the immediate three (3) business days prior to the bidding deadline. If an addendum is issued, all bidders shall acknowledge receipt of each addenda on their bid submission.

12. Questions During Bidding Period

Any questions during the bidding period as to the interpretation of the Invitation to Bid, form of proposal, form of Contract, plans, specifications or form of performance and payment bonds, must be received by the City not less than five (5) days prior to the date set for receipt of bids. Written inquiries should be directed to: The Department of Community Development and Planning, Manca Annex, 115 Pleasant Street, Room 201, Gardner, MA 01440. Attn: Joshua Cormier, Assistant Director.

The Owner will forward, via certified mail, return receipt requested, via confirmed facsimile, or email to all prospective bidders at the address given by them, interpretations of all questions raised in accordance with this section, which in the Owner's opinion, require such interpretation. The Owner's response shall be issued not less than two days prior to the date set for receipt of bids. Oral representations shall not bind the Owner.

13. Competence

No Contract shall be awarded except to responsible, established bidders capable of performing the class of work contemplated. Before the awarding of the Contract, any bidder may be required to show that it has the necessary facilities, experience, ability and financial resources to perform the work in a satisfactory manner and within the time stipulated. The bidder may be required to furnish the Owner with statements as to its experience and financial status. The bidder agrees upon request of the Owner to furnish in confidence such information as will enable it to judge the financial responsibility of the bidder and any listed subcontractors.

**MUNICIPAL CONTRACTS
STATE-ASSISTED BUILDING PROJECTS**

APPENDIX TO BIDDING INSTRUCTIONS

GOALS FOR PARTICIPATION BY MINORITY BUSINESS ENTERPRISES (MBE) AND WOMEN BUSINESS ENTERPRISES (WBE) (EXECUTIVE ORDER 390, M.G.L. c. 7, s. 4)

The applicable goals for minority business enterprise (MBE) and woman business enterprise (WBE) participation established for this Contract are as follows:

Combined MBE/WBE: 10.4 % of the Construction Contract Price.

Combined MBE/WBE: 17.9 % of the Design Contract Price.

A. MBE AND WBE PARTICIPATION

1. The apparent low Bidder's compliance with the requirements of this Section is a pre-requisite for receiving the Award of the Contract.
2. The MBE and WBE participation goals for this Contract are as set forth above. The Awarding Authority reserves the right to reduce or waive the MBE or WBE participation goals established for this Contract upon written request made by a general Bidder within the time frame set forth in paragraph 9 below. Such written request must demonstrate to the satisfaction of the Awarding Authority that it is not feasible for a non-MBE or non-WBE general Bidder to meet the goals established for this Contract based upon any or all of the following: (i) actual MBE/WBE availability, (ii) the geographic location of the project to the extent related to MBE/WBE availability, (iii) the scope of the work, (iv) the percentage of work available for subcontracting to MBE/WBEs and/or (v) other relevant factors, including a documented inability by the prospective Bidder to obtain commitments from MBE/WBE subcontractors sufficient to meet the MBE/WBE goals after having made a diligent, good faith effort to do so. All of the foregoing documentation shall accompany the Bidder's request for a reduction or waiver of the MBE/WBE participation goals. Such documentation shall include, at a minimum, the following:
3. A list of all items of work under the Contract that the Bidder made available for subcontracting to MBE/WBEs. The Bidder shall identify all items of work, other than work to be performed by filed sub-Bidders, that the Bidder did not make so available and shall state the reasons for not making such work available for subcontracting to MBE/WBEs. The Bidder shall also demonstrate that, where commercially reasonable, subcontracts were divided into scopes or tasks capable of being performed by MBE/WBEs.

4. Evidence that the Bidder sent written notices soliciting Bids or proposals to perform the items of work made available by the Bidder for subcontracting to all MBE/WBEs qualified to perform such work. The Bidder shall identify (i) each MBE/WBE solicited, and (ii) each MBE/WBE listed in the SOMWBA directory under the applicable trade category that was not solicited and reasons therefore. The Bidder shall also state the date that notices were mailed and provide a copy of the written notice(s) sent.
5. Evidence that the Bidder made reasonable efforts to follow up the written notices sent to MBE/WBEs with telephone calls or personal visits in order to determine with certainty whether the MBE/WBEs were interested in performing the work. Phone logs or other documentation must be submitted.
6. A statement of the response received from each MBE/WBE solicited, including the reason for rejecting any MBE/WBE who submitted a bid or proposal.
7. Evidence of reasonable efforts made, if any, to assist MBE/WBEs that needed assistance in obtaining bonding or insurance, or lines of credit with suppliers if the inability of MBE/WBEs to obtain bonding, insurance, or lines of credit is the reason given for the Bidder's inability to meet the MBE/WBE goals.
8. The Bidder may also submit any other information supporting its request for a waiver or reduction in the MBE/WBE participation goals, including without limitation evidence that the Bidder placed advertisements in appropriate media and trade association publications announcing the Bidder's interest in obtaining bids or proposals from MBE/WBEs, and/or sent written notification to MBE/WBE economic development assistance agencies, trade groups and other organizations notifying them of the Contract and the work to be subcontracted by the Bidder to MBE/WBEs. The Bidder shall also submit any other information reasonably requested by the Awarding Authority to show that the Bidder has taken all actions that could reasonably be expected to achieve the MBE/WBE participation goals.
9. If **filed Sub-Bids** are solicited for this Contract, requests from prospective general Bidders to reduce or waive the MBE/WBE participation goals for this Contract must be received by the Awarding Authority no later than five (5) working days after the list of filed sub-Bidders is mailed by the Awarding Authority to persons who have taken out plans for the Contract. If there are no filed sub-Bids solicited for this Contract, requests to reduce or waive the MBE/WBE participation goals for this Contract must be received by the Awarding Authority no later than ten (10) calendar days before the date set for the receipt of general Bids. **THE AWARDING AUTHORITY WILL NOT CONSIDER ANY REQUEST TO REDUCE OR WAIVE THE MBE/WBE PARTICIPATION GOALS FOR THIS CONTRACT THAT IS RECEIVED AFTER THESE DEADLINES. Any reduction or waiver of the MBE/WBE participation goals for this Contract will be made by written addendum mailed to all persons who have taken out plans for the project.**
10. No later than five (5) working days after the opening of general Bids, the apparent low Bidder shall submit the following documents to the Awarding Authority's Affirmative Marketing Construction Officer (AMCO): (i) a completed Schedule for Participation by

MBE/WBE ("Schedule for Participation") in the form provided by the Awarding Authority showing MBE/WBE participation in amounts equal to or exceeding the MBE/WBE participation goals for this Contract, (ii) a completed Letter of Intent in the form provided by the Awarding Authority for each MBE/WBE listed in the Schedule for Participation, and (iii) a SOMWBA most recent certification letter for each MBE/WBE listed in the Schedule of MBE/WBE Participation showing that the MBE/WBE is certified in the area of work for which it is listed on the Letter of Intent.

11. Each Letter of Intent shall identify and describe the work to be performed by the named MBE/WBE (the "MBE/WBE Work") with enough specificity to permit the Awarding Authority to identify the particular items of contract work that the MBE/WBE will perform for MBE/WBE participation credit. The Awarding Authority reserves the right to reject any Letter of Intent if the price to be paid for the MBE/WBE Work does not bear a reasonable relationship to the value of such work under the Contract as determined by the Awarding Authority.
12. Within five (5) working days after receipt of the Schedule for MBE/WBE Participation, Letters of Intent, and SOMWBA most recent certification letter, the Awarding Authority shall review and either approve or disapprove the apparent low Bidder's submissions. If the apparent low Bidder has not submitted an appropriate Schedule for MBE/WBE Participation and appropriate Letters of Intent and SOMWBA most recent certification letter establishing that the MBE/WBE participation goal for the project will be met, the apparent low Bidder will be considered ineligible for Award of the Contract and the Awarding Authority will Award the Contract to the second lowest eligible and responsible Bidder, subject to said Bidder's compliance with these conditions. If funds are insufficient to award to the second lowest Bidder, the project may have to be re-bid.
13. The Bidder's attention is called to the General Conditions of the Contract which requires the Contractor to submit, within thirty (30) days of the Contract Date, signed subcontracts with all subcontractors or a purchase order or invoice from each material supplier and/or manufacturer listed on the Schedule for MBE/WBE Participation.
14. A filed sub-Bidder is not required to submit a Schedule of MBE/WBE Participation with its Bid. A filed sub-Bidder may, at its option, submit a Letter of Intent with its Bid if it is a SOMWBA certified MBE/ WBE. If a filed sub-Bidder intends to sub-subcontract work to a SOMWBA certified MBE/WBE, and the awarding authority permits limited sub-sub contracting for purposes of MBE/WBE participation, and the filed sub-Bidder wishes that sub-subcontract to be credited toward the participation goals for this Contract, the filed sub-Bidder should submit a Letter of Intent from that MBE/WBE with its Bid.

CITY OF GARDNER
DEPARTMENT OF COMMUNITY DEVELOPMENT AND PLANNING
“QUALIFICATION STATEMENT”

Submit this form with your bid. Answer all questions. Responses must be clear and comprehensive. If necessary, attach separate sheets for answers. The party who will submit the bid for the firm must sign this form. This statement must be notarized. Bidders may submit additional supporting information if they desire.

1. Name of Bidder.
2. Location of permanent main office.
3. When was the firm organized?
4. How many years have you been engaged in the contracting business under your present firm or trade name?
5. Describe the general character of work performed by your company.
6. List the contracts your firm has on hand stating for each contract: name and address of the client and name of the person supervision for the client; contract value; the start and stop dates.
7. List at least three (3) similar contracts recently completed by your firm, stating for each contract: name and address of client and name of person supervision for client; contract value; and the month and year completed.
8. Have you ever failed to complete any contract awarded to you? ☐ Yes ☐ No
If so, explain where and why.
9. Have you ever defaulted on a contract: ☐ Yes ☐ No
If so, explain where and why.
10. Describe your experience in construction work similar in nature and scope to this project.

11. Describe the background and experience of the principal members of your organization, including the officers.
12. Identify the employee who will be responsible for managing this project.
13. List the major equipment your firm has available for this contract.
14. Credit available:
15. Provide a bank reference (name and address of institution, name of supervising person for the bank)
16. Will you provide a detailed financial statement and furnish such other information as the City of Gardner, Department of Community Development and Planning may reasonably request?
☐ Yes ☐ No

The undersigned certifies under the law of perjury that the information provided in this Qualification Statement is true, complete and correct. The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by the City of Gardner, Department of Community Development and Planning to verify the information provided in this Qualification Statement.

By: _____ Date: _____

Type or print name and title: _____

COMMONWEALTH / STATE OF _____

_____ County, SS.

On this _____ day of _____, 20____, before me, the undersigned notary public, personally appeared _____ (name of document signer), proved to me through satisfactory evidence of identity, which was/were _____, to be the person whose name is signed on the preceding or attached document, and acknowledge to me that (he) (she) signed it voluntarily and for its stated purpose.

Notary Public
My Commission Expires:

SECTION 00410

BID FORM

SECTION 00410

FORM FOR GENERAL BID

PROJECT IDENTIFICATION:

Theater Park and Parking Lot Redevelopment Project
32 Parker Street
Gardner, Massachusetts

TABLE OF ARTICLES

1. Bid Recipient
2. Bidder's Acknowledgements
3. Bidder's Representations
4. Bidder's Certifications
5. Basis of Bid
6. Time of Completion
7. Attachments to This Bid
8. Bid Submittal

ARTICLE 1 - BID RECIPIENT

- 1.1 This Bid is submitted to:

City of Gardner Department of Community Development and Planning
115 Pleasant Street – City Hall Annex
Gardner, MA 01440
- 1.2 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGEMENTS

- 2.1 Bidder accepts all of the terms and conditions of the Advertisement for Bids and Instructions to Bidders, including without limitation, those dealing with the disposition of Bid deposit. The Bid will remain subject to acceptance for 30 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

- 3.1 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:
 - A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents and hereby acknowledges the receipt of all Addenda.

- B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and has satisfied itself as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 - BIDDER'S CERTIFICATION

- 4.1 Bidder certifies that Bidder is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work, that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll

report for each employee, and that Bidder will comply fully with all laws and regulations applicable to awards made subject to MGL Chapter 149, Section 44A.

- 4.2 Bidder certifies that, under penalty of perjury, Bidder is not presently debarred from doing public construction work in the Commonwealth under the provisions of MGL Chapter 29, Section 29F or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder; and is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.
- 4.3 Bidder hereby certifies under the penalties of perjury, to the best of Bidder's knowledge and belief, that Bidder has filed all State tax returns and paid all State taxes required by law.
- 4.4 Bidder certifies that, under penalties of perjury, there have been no substantial changes in Bidder's financial position or business organization other than those changes noted within the application since the applicant's most recent prequalification statement and that the Bid is in all respects bona fide, fair and made without collusion or fraud with any other person. "Person" here means any natural person, joint venture, partnership, corporation or other business or legal entity which sells materials, equipment or supplies used in or for, or engages in the performance of, the same or similar construction, reconstruction, installation, demolition, maintenance or repair work or any part thereof.
- 4.5 Bidder certifies that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
- 4.6 Bidder certifies that Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
- 4.7 Bidder certifies that Bidder has not solicited or induced any individual or entity to refrain from bidding.
- 4.8 Bidder certifies that Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph:
 - A. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;
 - B. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of the Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 - C. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
 - D. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 - BASIS OF BID

- 5.1 Bidder proposes to furnish all labor and materials required for construction of the Theater Park and Parking Lot Redevelopment Project in accordance with the accompanying Bidding

Documents prepared by Tighe & Bond, Inc., for the Contract Price specified below, subject to additions and deductions according to the terms of the Bidding Documents.

5.2 This Bid includes Addenda numbered _____.

5.3 The proposed Contract Price (base bid) is:

_____ dollars
(words)

(\$ _____)

(figures)

Alternate No.1, Add \$ _____; Deduct \$ _____

ARTICLE 6 - TIME OF COMPLETION

- 6.1 Bidder agrees that the Work will be substantially completed and ready for final payment in accordance with paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.2 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times as stated in the Agreement.

ARTICLE 7 - ATTACHMENTS TO THIS BID

7.1 The following documents are attached to and made a condition of this Bid:

- A. Bid deposit in the amount of _____ dollars (\$ _____), consisting of a bid bond in the amount of five percent of the total amount of Bid
- B. Evidence of authority to sign
- C. List of Project References
- D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids
- E. City of Gardner Department of Community Development and Planning "Qualification Statement".

ARTICLE 8 - BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

By:

[Signature] _____

[Printed name] _____

(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

Bidder's License No.: _____

(where applicable)

END OF SECTION

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BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

BID

Bid Due Date:

Description (*Project Name— Include Location*):

BOND

Bond Number:

Date:

Penal sum _____ \$ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER

SURETY

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____ By: _____
Signature Signature (Attach Power of Attorney)

Print Name Print Name

Title Title

Attest: _____ Attest: _____
Signature Signature

Title Title

Note: Addresses are to be used for giving any required notice.

Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2 All Bids are rejected by Owner, or
 - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 00520

AGREEMENT

AGREEMENT

BY AND BETWEEN

THE CITY OF GARDNER

AND

CONTRACTOR

THIS AGREEMENT made this _____ day of _____, 2018, by and between the City of Gardner, located at 95 Pleasant Street, Gardner, MA 01440, hereinafter call the "Owner", acting herein through the City of Gardner's Department of Community Development and Planning, and _____, located at _____, hereinafter called the "Contractor",

WITNESSETH, that the Owner and the Contractor, for the consideration hereafter named, agree as follows:

Article 1. SCOPE OF WORK:

The Contractor shall furnish all labor, tools, equipment and materials necessary to perform the Work required under the terms and conditions of the Contract Documents for the Theater Park and Parking Lot Redevelopment Project.

Article 2. TIME OF COMPLETION:

The Contractor shall commence work under this Contract on the date specified in the written "Notice to Proceed" from the Owner and shall bring the work to Substantial Completion by April 1, 2019. Damages for delays in the performance of the Work shall be as specified within the General Conditions of the Contract Documents.

Article 3. THE CONTRACT SUM:

The Owner shall pay the Contractor in current funds for the performance of the Work, subject to additions and deductions by Change Order(s), the Contract Sum of \$ _____.

Article 4. THE CONTRACT DOCUMENTS:

The following, together with this Agreement, form the Contract Documents and all are as fully a part of the Contract as if attached to this Agreement or repeated herein: Advertisement, Bidding Documents, Contract Forms, Conditions of the Contract, and Specifications as enumerated in the Table of Contents; the Drawings as enumerated in the List of Contract Drawings; Addenda; Modifications issued after execution of the Contract; and other documents enumerated under Section 2.6 of the General Conditions.

Terms used in this Agreement which are defined in the Conditions of the Contract, shall have the meanings designated in those Conditions.

Article 5. ALTERNATES:

The following Alternates have been accepted and their costs are included in the Contract Sum stated in Article 3 of this Agreement:

<u>Alternate No(s)</u>	<u>Written Amount</u>	<u>Dollar Amount</u>
_____	_____	\$ _____
_____	_____	\$ _____
_____	_____	\$ _____
_____	_____	\$ _____

By signing this Agreement, the Contractor certifies under the penalties of perjury that it has complied with all laws of the Commonwealth relating to taxes.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed as of the date first above written:

CONTRACTOR

CITY OF GARDNER

By: _____

By: _____
Mark P. Hawke, Mayor

By: _____
Jennifer Dymek, Purchasing Director

By: _____
Atty. John Flick, City Solicitor

CERTIFIED AS TO AUTHORITY OF THE
MAYOR AND AVAILABILITY OF FUNDS
IN THE AMOUNT OF

By: _____
John Richards, City Auditor

(If a corporation, attach to each signed Contract a notarized copy of the corporate vote authorizing the signatory to sign this Contract, and the executed tax attestation.)

SECTION 00610

PERFORMANCE BOND

PERFORMANCE BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal *(seal)*

Surety's Name and Corporate Seal *(seal)*

By: _____
Signature

By: _____
Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a

qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper

payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

SECTION 00615

PAYMENT BOND

PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature

By: _____
Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
 - 5.1 Claimants who do not have a direct contract with the Contractor,
 - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2 Pay or arrange for payment of any undisputed amounts.
 - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the

Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

SECTION 00700

GENERAL CONDITIONS

GENERAL CONDITIONS - INDEX

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GENERAL CONDITIONS

1. Funding Source

The project to be constructed and pursuant to this Contract shall be financed with assistance from the Massachusetts Community Development Block Grant Program and is subject to all applicable federal, state and local regulations. Compliance with related regulations attached as Assurance of Compliance (Section 3) and HUD Form 4010 shall be required of the Contractor.

2. Definitions

- 2.1 Addenda - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, Drawings and Specifications, by additions, deletions, clarifications or corrections.
- 2.2 Bid - The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
- 2.3 Bidder - Any person, firm or corporation submitting a Bid for the Work.
- 2.4 Bonds - Bid, Performance and Payment Bonds, and other instruments of security, furnished by the Contractor and/or its Surety, in accordance with the Contract Documents.
- 2.5 Change Order - A written order to the Contractor executed by both parties authorizing an addition, deletion or revision in the Work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time.
- 2.6 Contract Documents - The Contract, including Advertisement for Bids, Agreement, Information to Bidders, Bid, Bid Bond, Form for General Bid, Agreement, Payment Bond, Performance Bond, Notice of Award, Notice to Proceed, written Change Orders, Plans, Specifications and Addenda.
- 2.7 Contract Price - The total moneys payable to the Contractor under the terms of conditions of the Contract Documents.
- 2.8 Contract Time - The number of calendar days stated in the Contract Documents for the completion of the Work.
- 2.9 Contractor - The person, firm or corporation with whom the Owner has executed the Agreement.
- 2.10 Drawings - The part of the Contract Documents which show the characteristics and scope of the work to be performed and which have been prepared or approved by the Engineer.

- 2.11 Engineer - The individual or firm authorized by the Owner to prepare and review the technical specifications and drawings which the Contractor shall follow in performing the Work.
- 2.12 Field Order - A written order effecting a change in the Work not involving an adjustment in the Contract Price, or an extension of the Contract Time, issued by the Engineer to the Contractor during construction.
- 2.13 Notice of Award - The written notice from the Owner to the successful Bidder of acceptance of the Bid.
- 2.14 Notice to Proceed - Written communication issued by the Owner to the Contractor authorizing it to proceed with the Work and establishing a date of commencement and completion of the Work.
- 2.15 Owner - A public or quasi-public body or authority, corporation, association, partnership, or individual with whom the Contractor has executed the Agreement, and for whom the Work is to be performed,
- 2.16 Plans - The Contract Drawings, or exact reproductions thereof, which show the scope, character, dimensions and details of the Work, and which have been prepared or approved by the Engineer.
- 2.17 Project - The undertaking to be performed as provided in the Contract Documents.
- 2.18 Project Representative - The duly authorized representative of the Owner.
- 2.19 Resident Project Engineer - The representative of the Owner who is assigned to the Project site or any part thereof and reports to Project Representative. Resident Project Engineer shall have no authority to bind the Owner to expend funds in excess of appropriated funds, or to modify the specifications, or to suspend or terminate the work.
- 2.20 Shop Drawings - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a subcontractor, manufacturer, supplier or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.
- 2.21 Specifications - A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.
- 2.22 Special Conditions or Provisions - Revisions or additions to the General Conditions, Supplemental General Conditions or Specifications applicable to an individual project.

- 2.23 Subcontractor - An individual, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part or whole of the Work at the site.
- 2.24 Substantial Completion - That date as certified by the Engineer when the construction of the Project or a specified part thereof is sufficiently completed in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it is intended.
- 2.25 Supplemental General Conditions - Additions or modifications to these General Conditions supplying detailed information required for the project documents.
- 2.26 Supplier - Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.
- 2.27 Work - All labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in the Project.

3. Contract Plans and Specifications

All plans, specifications and addenda, hereinafter enumerated or referenced in this contract, shall form part of this Contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein set fully forth. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit or cast light on the interpretation of the provisions to which they refer.

4. Additional Instructions and Detail Drawings

The Owner may in its discretion provide the Contractor with additional instructions and detail drawings as necessary to carry out the work included in the contract, and the Contractor shall carry out the work in accordance with the same. The Contractor shall prepare for approval by the Engineer: (a) a schedule, fixing the dates at which special detail drawings will be required, such drawings, if any, to be furnished by the Engineer in accordance with said schedule, and (b) a schedule fixing the respective dates for the submission of shop drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment, and the completion of the various parts of the work; each such schedule to be subject to change from time to time in accordance with the progress of the work.

5. Shop or Setting Drawings

The Contractor shall submit promptly to the Engineer three (3) copies of each shop or setting drawing prepared in accordance with the schedule predetermined as aforesaid.

After examination of such drawings by the Engineer and the return thereof, the Contractor shall make such corrections to the drawings as have been indicated and shall furnish the Engineer with three (3) corrected copies. The Contractor shall furnish additional copies as requested by the Engineer. Regardless of corrections made in or approval given to such drawings by the Engineer, the Contractor shall nevertheless be responsible for the accuracy of such drawings and for their conformity to the plans and specifications, unless Contractor notifies the Engineer in writing of any deviations at the time such drawings are furnished.

6. Materials, Services and Facilities

- 6.1 Except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature and all other services and facilities of every nature whatsoever necessary to execute, complete and deliver the work within the specified time.
- 6.2 Prior to installation, the Contractor shall furnish to the Engineer for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which Contractor contemplates installing, together with full information as to type, performance characteristics, and all other pertinent information as required.
- 6.3 Materials specified by reference to the number or symbol of a specific standard (such as A.S.T.M. Standard, a Federal Specification or other similar standard), shall comply with requirements of the most recent revision thereof and any amendment or supplement thereto in effect on the date of the Advertisement, except as limited to type, class or grade, or modified in such reference. The standards referred to, except as may be modified by the Contract Documents, shall have full force and effect as though printed therein.
- 6.4 When requested by the Engineer, the Contractor shall submit Certificates of Compliance from the manufacturer, certifying that the equipment materials comply with the requirements of the specifications or standards. Such certification shall be in the following form:

(sample - on manufacturer's letterhead)
CERTIFICATE OF COMPLIANCE
- (manufactured or fabricated materials) -

Date: _____, 20__

This certifies that _____
(description, kind of material, Model No., etc.)

Furnished to _____
(name of contractor, general or sub)

For use on _____

In the amount of _____
(project name)
Identified by _____
(quantity represented)
Shipped on _____, 20____, Delivered on _____, 20____
Shipped via _____
(method of shipment, Car No., Truck No.)

Meets the requirements of the pertinent project plans, special conditions and specifications of the subject project in all respects. Processing, product testing and inspection control of raw material are in conformance with all applicable specifications, drawings and/or standards of all articles furnished.

All records and documents pertinent to this Certificate and not submitted herewith shall be maintained available by the undersigned for a period of not less than three years from the date of the Certificate.

(name of manufacturer)

By: _____
(name and title of authorized signatory)

- 6.5 Any work necessary to be performed after regular working hours, on Sunday or Legal Holidays, shall be performed without additional expense to the Owner.

7. **Contractor's Title to Materials**

No materials or supplies for the work shall be purchased by the Contractor or by any Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that it has good title to all materials and supplies used by him in the work, free from all liens, claims or encumbrances.

The Contractor shall obtain all necessary rights and licenses to allow the Owner to use the goods and services provided by this Agreement in full compliance with any and all copyright, patent rights or licenses, without requiring additional payment by the Owner.

8. **Title to Work**

The title to all work completed and in the course of construction and of all material on account of which any payment has been made shall be in the Owner.

9. **Inspection and Testing of Materials**

All materials and equipment used in the construction of the project shall be subject to inspection and testing by the Owner, or its designee, in accordance with accepted standards to establish conformance with specifications and suitability for uses intended. Nevertheless, said inspection and/or testing, or a lack thereof, shall not relieve the Contractor of its obligations under the terms and conditions of the Contract Documents.

10. Express Warranty

The Contractor guarantees to Owner that all materials incorporated into the work shall be new unless otherwise specified or agreed by the Parties. Contractor also guarantees that all work shall be done in a workmanlike manner, free from defects, and in conformance with any and all specifications contained in the Contract Documents.

The work performed by the Contractor shall conform to the high professional standard of care and practice customarily expected of those engaged in performing comparable work, the personnel furnishing said services shall be qualified and competent to perform adequately the services assigned to them and the recommendations, guidance and performance of such personnel shall reflect such standards of professional knowledge and judgment.

11. Maintenance and Guarantee

The Contractor guarantees that all work performed under this contract shall meet fully all requirements thereof as to quality of workmanship and of materials. The Contractor hereby agrees to make at its own expense any repairs or replacements made necessary by defects in materials or workmanship that become evident within one (1) year after the date of the final payment, and to restore to full compliance with the requirements set forth herein any part of the work constructed hereunder, which during said one (1) year period is found by the Owner to be deficient with the respect to any provisions of the specifications. The Contractor shall hold the Owner harmless from claims of any kind arising from damage due to said defects. The Contractor shall make all repairs and replacements promptly upon receipt of written orders for same from the Owner. If the Contractor fails to make the repairs and replacements promptly, the Owner may do the work and the Contractor shall be liable to the owner for the full cost thereof.

12. "Or Equal" Clause

Whenever a material, article or piece of equipment is identified on the plans or in the specifications by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., it is intended merely to establish a standard; and, any materials, article or equipment of other manufacturers and vendors which will perform adequately the duties imposed by the general design shall be considered equally acceptable provided the

material, article or equipment so proposed is, in the opinion of the Engineer, of equal substance and function. It shall not be purchased or installed by the Contractor without the Engineer's prior written approval. Notwithstanding any provision to the contrary, the requirements of MGL c. 30, sec. 39M(a) are hereby incorporated and made a part of this Agreement.

13. Surveys, Permits and Regulations

Unless otherwise expressly provided for in the specifications, the Owner shall furnish to the Contractor all surveys necessary for the execution of the work. The Owner, however, does not warrant or guarantee the accuracy or completeness of said surveys.

The Contractor shall procure and pay for all permits, licenses and approvals necessary for the execution of this contract, and shall comply with the provisions of 24 CFR 85.36(h)(1)-(3) and Massachusetts General Laws with respect to bonding and other insurance requirements.

The Contractor shall comply with all laws, ordinances, rules, orders and regulations relating to performance of the work, the protection of adjacent property and the maintenance of passageways, guard fences or other protective facilities.

14. Contractor's Obligations

The Contractor shall, in good and workmanlike manner, perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, as are necessary and/or proper to perform and complete all the work required by this Contract, within the time herein specified, in accordance with the provisions of this Contract and said specifications and in accordance with the plans and drawings covered by this Contract any and all supplemental plans and drawings, and in accordance with the directions of the Engineer as may be given from time to time during the progress of the work. Contractor shall furnish, erect, maintain and remove such facilities, equipment, material and temporary works as may be required.

The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements and limitations of the Contract and specifications, and shall perform, carry on and complete the entire work to the satisfaction of the Engineer and the Owner.

15. Weather Conditions

In the event of temporary suspension of work, or during inclement weather, or whenever the Engineer with the Owner's approval shall direct, the Contractor shall, and shall cause its subcontractors to, protect carefully all work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any work or materials have been damaged or injured by reason of failure on the part of the Contractor or any of its

subcontractors to so protect such work, said materials shall be removed and replaced at the expense of the Contractor.

16. Protection of Work and Property - Emergency

The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this Contract, and shall at all times safely guard and protect its own work, and that of adjacent property from damage. The Contractor shall replace or make good any such damage, loss or injury unless such be caused directly by errors contained in the Contract or by the Owner, or its duly authorized representatives.

In case of an emergency which threatens loss or injury of property, and/or safety of life, the Contractor is allowed to act, without previous instructions from the Engineer, in a diligent manner to prevent said loss or injury. Contractor shall immediately notify the Engineer and Owner in writing thereafter, and shall promptly submit any resulting claim for extra work to the Engineer.

Where the Contractor has not taken action but has notified the Engineer of an emergency threatening loss or injury to persons or property, or damage to the work or any adjoining property, it shall act as instructed or authorized by the Engineer.

The amount of extra payment claimed by the Contractor on account of any emergency action shall be determined in the manner provided in Paragraph 20 below.

17. Inspection

The authorized representatives and agents of the Owner, the Commonwealth, including but not limited to its Department of Housing and Community Development (DHCD), and the federal Department of Housing and Urban Development shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials and other relevant data and records.

18. Reports, Records and Data

The Contractor shall submit to the Owner such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed under this Contract. All records shall be retained by the Contractor for a period of seven years from completion of the work.

All documents produced pursuant to this Agreement shall be the property of the Owner.

All information required from the Owner, or from others at the expense of the Owner, in the performance of this Agreement shall be and remain the property of the Owner. This includes, but is not limited to, all records, data files, computer records, work sheets, deliverable products (complete and incomplete) and all other types of information prepared or acquired by the Contractor in the performance of this Agreement. The

requirements of MGL c. 30, sec. 39R are hereby incorporated and made a part of this Agreement.

19. Superintendence by Contractor

At the site of the work, the Contractor shall employ a construction superintendent or foreman who shall have full authority to act for the Contractor, and shall be acceptable to the Engineer and Owner, and shall be a person anticipated to be continued in that capacity for the duration of the Agreement. The requirements of MGL c. 30, ss. 39I and 39N are hereby incorporated and made a part of this Agreement.

20. Changes in Work

20.1 The Contractor shall make no changes in the work without prior written approval of the Owner, however, the Owner may at any time by written order, and without notice to any sureties, require the performance of such extra work or changes in the work as may be found necessary or desirable. Charges or credits for any such changes shall be determined by one or more, or a combination of, the following methods:

- (a) Unit bid prices previously approved.
- (b) An agreed lump sum.
- (c) The actual cost of-
 - 1. Labor, including foremen.
 - 2. Materials entering permanently into the work.
 - 3. The ownership or rental cost of construction plant and equipment during the time of use on the extra work.
 - 4. Power and consumable supplies for the operation of power equipment.
 - 5. Insurance.
 - 6. Wages to be paid.

To the cost under (c) there shall be added a fixed fee to be agreed upon but not to exceed fifteen percent (15 %) of the actual cost of work. The fee shall include the cost of supervision, overhead, bond, profit and any other general expenses.

20.2 The Engineer may authorize minor changes or alterations in the work which do not involve any extra cost or expense, and which are not inconsistent with the overall intent of the Contract Documents. If the Contractor determines that any such minor change or alteration so authorized by the Engineer entitles Contractor to an increase in the contract price, the Contractor shall be required to obtain prior written approval from the Owner as per paragraph 20.1 above.

21. Time for Completion and Liquidated Damages

It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning and the time for completion of the work to be done hereunder are ESSENTIAL CONDITIONS of this Contract; and it is further mutually

understood and agreed that the work embraced in this Contract shall be commenced on a date to be specified in the "Notice to Proceed."

The Contractor shall prosecute the work regularly, diligently, without interruption and at such rate of progress as will ensure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

If the Contractor neglects, fails or refuses to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a partial consideration for the awarding of this Contract, to pay to the Owner the amount of \$250.00, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work.

The said amount of liquidated damages is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would sustain in such event and said amount shall be retained from time to time by the Owner from current periodic estimates.

It is further agreed that time is of the essence of each and every portion of this Contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. Provided, that the Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner; provided, further, that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

- (a) To any preference, priority or allocation order duly issued by the Government.
- (b) To unforeseeable cause beyond the control and without the fault of negligence of the Contractor, including, but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and severe weather.
- (c) To any delays of Subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article.

Provided further, that the Contractor shall within ten (10) days from the beginning of such delay, notify the Owner, in writing, of the causes of the delay, and provide such additional information as the Owner may require, and the Owner shall ascertain the facts

and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

22. Correction of Work

All work, all materials, whether incorporated in the work or not, all processes of manufacture, and all methods of construction shall be at all times and places subject to the inspection of the Engineer who shall be the final judge of the quality and suitability of the work, materials, processes of manufacture and methods of construction for the purposes for which they are used. Should they fail to meet the Engineer's approval, they shall be forthwith reconstructed, made good, replaced and/or corrected, as the case may be, by the Contractor at its own expense. Rejected materials shall immediately be removed from the site. If, in the opinion of the Engineer, it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the work injured or not performed in accordance with the Contract Documents, the payment to the Contractor hereunder shall be reduced by such amount as in the judgment of the Engineer shall be equitable.

23. Subsurface Conditions Found Different

Should the Contractor encounter subsurface and/or latent conditions at the site materially differing from those shown on the plans or indicated in the specifications, Contractor shall, prior to disturbing such conditions, immediately provide written notice to the Engineer of such conditions. The Engineer shall thereupon promptly investigate the conditions, and if it is determined that such conditions materially differ from those shown on the plans or indicated in the specifications, the Engineer will at once make such changes in the plans and/or specifications as may be necessary. Any increase or decrease of cost resulting from such changes shall be adjusted in the manner provided in Paragraph 20 of these General Conditions. Notwithstanding any provision to the contrary, the requirements of MGL. c. 30, sec. 39N are hereby incorporated and made a part of this Agreement.

24. Right of Owner to Terminate Contract

The Owner may terminate this Contract by providing the Contractor and the Surety with ten (10) days written notice specifying the reasons for termination, including but not limited to those set forth below:

- (a) Violation of any of the provisions of this Contract by the Contractor or any of its subcontractors.
- (b) A determination by the Owner that the Contractor has engaged in fraud, waste, mismanagement, misuse of funds, or criminal activity with any funds provided by

this Contract.

- (c) Failure of the Contractor, for any reason, to fulfill in a timely and proper manner its obligations under this Contract including, but not limited to, compliance with applicable federal, state or local laws or regulations, and such procedures or guidelines as established for the Massachusetts Community Development Block Grant by DHCD;

If the Owner terminates or suspends this Agreement for one or more of the reasons set forth in (a) through (c), the Contractor shall have a right only to payment for work performed and accepted prior to said termination or suspension, and shall have no right to recover indirect or consequential damages, including but not limited to lost profits.

In the event of any such termination, the Surety shall have the right to take over and perform the Contract. Provided, however, that if the Surety does not commence performance within ten (10) days from the date of the mailing of notice of termination to such Surety, the Owner may take over the work and prosecute the same to completion at the expense of the Contractor, and the Contractor and his Surety shall be liable to the Owner for any excess cost. If the Owner takes over the work, it may take possession of and utilize, at no cost, such equipment, material and temporary works as may be on the site.

Further, the Owner may terminate or suspend this Contract if local, state and/or federal funding are cancelled, revoked, reduced, suspended or terminated.

If the Owner determines that a continuation of work on the project would endanger the life, health, or safety of those working or living at or near the project site, or that immediate action is necessary to protect public funds and/or property, the Owner may suspend work or terminate this Agreement by providing written notice to the Contractor. Should the Owner terminate or suspend this Agreement for any of the reasons set forth herein, the Contractor shall have a right only to payment for work performed and accepted prior to said termination or suspension and shall have no right to recover indirect or consequential damages, including but not limited to lost profits.

25. Payments to Contractor

- 25.1 Payment to the Contractor shall be in accordance with the requirements MGL, c. 30, s. 39K, which is hereby incorporated and made a part of this Agreement.
- 25.2 In preparing estimates, the material delivered on the site and preparatory work done may be taken into consideration.
- 25.3 Payment shall be contingent upon the Contractor submitting any and all required certified payroll reports to the Owner.
- 25.4 Payments shall be made in accordance with Supplemental General Condition Article 15.

26. Indemnification

The Contractor hereby indemnifies and shall at all times save and hold harmless the City of Gardner, and its officers, attorneys, employees, and agents, from and against any and all claims (including workers' compensation and wage claims), demands, suits, actions, liabilities, damages, penalties, judgments, and costs and expenses, including without limitation the costs and expenses of litigation, of or by anyone that in any way is caused by, arises out of, or is occasioned by the performance, activities, operations, conducts, negligence, or omissions of the Contractor, or any of its subcontractors, or the agents or employees of either, regardless of whether or not they are caused in part by a party indemnified hereunder.

27. Substantial Completion, Final Completion, Acceptance and Final Payment

- 27.1 Substantial completion shall be that point at which the work has been completed to the extent that the Owner may occupy and make use of the project for which it was intended.

Upon receipt of written notice from the Contractor that the work is substantially complete, the Engineer will promptly make an inspection to determine whether the work is acceptable under the terms of the Contract and whether same is substantially complete. The Engineer will issue a dated certificate which states that the work is substantially complete and accepted under the terms and conditions of the Contract, and a punch list of all items to be completed or corrected. The entire balance due the Contractor, less two percent (2%) retainage plus a retention based on the Engineer's estimate of the fair value of the punch list items, and cost of completing or correcting such items, and the estimated value of claims made relating to the project, shall be due and payable.

The general guarantee period for the work substantially complete shall begin on the date certified by the Engineer.

- 27.2 Final completion shall be that point at which all work on the project has been completed, all defective work has been corrected, and clean-up of the site and any debris has been accomplished. Unless a certificate of substantial completion has issued, the general guarantee period shall begin upon certification by the Engineer of final completion. The entire balance due the Contractor, less the estimated value of claims made relating to the project to the extent allowed by law, shall be due and payable within 35 days of the Contractor's written acceptance of the final estimate as required by MGL c. 30, s. 39G.
- 27.3 The acceptance by the Contractor of final payment shall be and shall operate as a release to the Owner of all claims and all liability by the Contractor. No payment, however, final or otherwise, shall operate to release the Contractor or its Sureties from any obligations under this Contract, the performance and payment bonds, or any express or implied warranties.

28. Insurance

The Contractor shall not commence work under this Contract until it has obtained and submitted proof to the Owner of all the insurance required under this paragraph and such insurance has been approved by the Owner. The form of proof shall be a Certificate furnished to the Owner no later than the time at which the Contractor executes the Contract.

(a) Workmen's Compensation Insurance:

The Contractor shall procure and shall maintain during the life of this Contract Workmen's Compensation Insurance as required by applicable federal, state or local law, for all of its employees and, in case of any such work sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees as required by law.

(b) Contractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance:

The Contractor shall procure and shall maintain during the contract term, occurrence basis Contractor's Public Liability Insurance, Contractor's Property Damage Insurance and Vehicle Liability Insurance in the amount of \$1,000,000.

(c) Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance:

The Contractor shall either (1) require each of its Subcontractors to procure and to maintain, during its subcontract term, occurrence basis Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance in the amount of \$1,000,000, or (2) insure the activities of such subcontractors, in addition to its policy specified in subparagraph (b) hereof.

(d) Builder's Risk Insurance (Fire and Extended Coverage):

Until the project is completed and accepted by the Owner, the Contractor shall maintain Builder's Risk Insurance (fire and extended coverage) on a 100 percent completed value basis on the insurable portion of the project for the benefit of the Owner, the Contractor, and Subcontractors as their interests may appear.

(e) Proof of Insurance:

The Contractor shall furnish the Owner with certificates showing the type, amount, class of operations covered, effective dates and date of expiration of policies. Such certificates shall also contain substantially the following

statement:

"The insurance covered by this certificate shall not be canceled or reduced,

except after thirty (30) days written notice has been received by the Owner.”

(f) Additional Insured and Certificate Holder

The Contractor shall have the “City of Gardner” named as an additional insured for this project on the policy, which shall be evidenced by the Certificate

submitted to the Owner. The Certificate holder shall read exactly as follows:
“Executive Director, Gardner Redevelopment Authority, 115 Pleasant St.,
Gardner, MA 01440.”

29. Contract Security, Performance and Payment Bonds

- 29.1 The Contractor shall furnish to the Owner, at the time of its execution of the Contract, a Performance Bond in an amount at least equal to one hundred percent (100 %) of the total contract price as security for the faithful performance of this Contract. Such bonds shall be in a form, and with a surety company approved by the Owner and authorized to do business in the Commonwealth of Massachusetts.
- 29.2 The Contractor shall furnish to the Owner, at the time of its execution of the Contract, a Payment Bond in an amount not less than one hundred percent (100 %) of the total contract price, as security for the payment of all persons performing labor on the project under this Contract, and furnishing materials in connection with this Contract. Such bond shall be in a form, and with a surety company approved by the Owner and authorized to do business in the Commonwealth of Massachusetts.
- 29.3 It is expressly understood and agreed that all sums retained or that may be retained by the City under any of the provisions of this Contract are solely for the benefit of the City and that the security required by MGL Ch. 149, sec. 29, as amended, is furnished exclusively by the bond accompanying the Contract.
- 29.4 Performance Bonds must remain in effect for at least TWO YEARS after final completion and acceptance of the project.
- 29.5 Failure to meet the bond requirements of this section shall be cause to terminate the Contract.

30. Assignments

The Contractor shall not assign or subcontract the whole or any part of this Contract or any moneys due or to become due hereunder without the prior written consent of the Owner. If the Contractor assigns all or any part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that the right of any assignee in and to any moneys due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations for

services rendered or materials supplied for the performance of the work required by this Contract.

31. Engineer's Authority

The Engineer will give all orders and directions contemplated under this Contract and specifications relative to the execution of the work. The Engineer shall determine the amount, quality, acceptability and fitness of the several kinds of work and materials which are to be paid for under this Contract and shall decide all questions which may arise in relation to said work and the construction thereof. The Engineer's estimates and decisions shall be final and conclusive, except as herein otherwise expressly provided. If any dispute arises between the parties hereto relative to said Contract and/or specifications, the determination of the Engineer shall be a condition precedent to the right of the Contractor to receive any money or payment for work related to said dispute. The Engineer does not have authority to bind the Owner to spend money in excess of the Contract Price, to suspend, terminate or stop the work.

The Engineer will decide the meaning and intent of any portion of the specifications and of any plans or drawings.

32. Use of Premises, Removal of Debris, Sanitary Conditions

The Contractor, at its own expense, shall: (1) take every precaution against injuries or damage to property; (2) store its apparatus, materials, supplies and equipment in such orderly fashion at the site as to not unduly interfere with the progress of its work or the work of other contractors; (3) place upon the work or any part thereof only such loads as are consistent with the safety of that portion of the work; (4) clean up frequently all refuse, rubbish, scrap materials and debris caused by its operations; (5) before final payment, remove all surplus material, falsework, temporary structures, including foundations thereof, plant of any description and debris of any nature resulting from its operations, and to put the site in neat, orderly condition; (6) effect all cutting, fitting or patching of its work required for conformance with the specifications and, except with consent of the Engineer, not cut or otherwise alter the work of any other contractor; and (7) maintain in a neat, sanitary condition such toilet accommodations for the use of its employees as may be necessary to comply with the State and local Boards of Health, or other bodies having jurisdiction over same.

33. Notice and Service Thereof

Any notice to either party from the other relating to this Agreement shall be in writing and posted, by certified mail, return receipt requested, to the party at the address noted below:

City

Contractor

Joshua Cormier, Assistant Director

Department of Community Development & Planning
Manca Annex, Room 201
115 Pleasant Street
Gardner, MA 01440

34. Subcontract

The Contractor shall insert in any and all subcontracts the Federal Labor Standards Provisions contained herein and such other clauses as the Department of Housing and Urban Development may, by instructions require.

35. Interest of Member of or Delegate to Congress

No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

36. Other Prohibited Interests

No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part thereof, any material supply contract, subcontract, insurance contract or any other contract pertaining to the project.

37. Suspension of Work

If the Owner is prevented or enjoined from proceeding with work either before or after the start of construction by reason of any litigation or other reason beyond the control of the Owner, the Contractor shall not be entitled to make or assert claim for damage by reason of said delay; but time for completion of the work shall be extended to such reasonable time as the Owner may determine will compensate for time lost by such delay with such determination to be set forth in writing. If the reason for said delay was not beyond the control of the Contractor, the Contractor shall have no right to damages, as set forth herein, or to an extension of time. Notwithstanding any provision to the contrary, the requirements of MGL c. 30, sec. 39O are hereby incorporated and made a part of this Agreement.

38. Access to Records

The Contractor shall maintain accounts and records, including personnel, property and financial records, adequate to identify and account for all costs pertaining to the Contract and such other records as may be deemed necessary by the Owner to ensure proper accounting for all project funds, both CDBG and non-CDBG shares. These records shall be made available for audit purposes to the Owner or any authorized representative, and shall be retained for seven years after final Mass. CDBG audit.

39. Age Discrimination Act of 1975 (for contracts over \$2,000)

No person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination from receiving Federal financial assistance. The Contractor shall comply with the provisions of the Age Discrimination Act of 1975 (42 U.S.C. 6101 et seq.), prohibiting age discrimination in employment.

40. Non-Discrimination

The City of Gardner is an Equal Opportunity Employer. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, age, handicap, or national origin. The Contractor shall take affirmative action to ensure that applicants for employment and employees are treated without regard to their race, color, religion, sex, age, handicap, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices setting forth the provision of this non-discrimination clause. The Contractor shall state in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that all qualified applicants shall receive consideration for employment without regard to race, color, religion, sex, age, handicap, or national origin. The Contractor shall incorporate the foregoing requirements of this paragraph in all contracts for work to be performed in accordance with this Contract, and shall require all of its subcontractors to incorporate such requirements in all subcontracts for program work. The City may cancel, terminate or suspend the Contract in whole or in part for any violation of this paragraph.

The Contractor shall adhere to the requirements set forth in Title VI of the Civil Rights Act of 1964 (Public Law 88-352), and the regulations issued pursuant thereto by HUD (24 CFR Part 1); Title VIII of the Civil Rights Act of 1968 (Public Law 90-284), as amended; Section 109 of the Housing and Community Development Act of 1974, and the HUD regulations issued pursuant thereto (24 CFR 570.601); Federal Executive Order 11063, as amended by Executive Order 12259 and the HUD regulations issued pursuant thereto (24 CFR 107); Executive Order 11246 and the rules, regulations and relevant orders of the U.S. Secretary of Labor, if applicable; The Age Discrimination Act of 1975 (42 U.S.C. 6101 et seq.); Section 402 of the Veterans of the Vietnam Era Act (for

projects of \$10,000 or more). Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794); Massachusetts General Laws Chapter 151B, section I et seq.; State Executive Order 74 as amended and revised by Executive Orders 116,143 and 227, and MASS. CDBG regulations, procedures or guidelines; Title 11 of the Uniform Relocation Assistance and Real Property, Acquisition Policies Act of 1979; and MASS. CDBG guidelines, procedures, or regulations.

Contracts subject to Federal Executive Order 11246, as amended, shall be subject to HUD Equal Employment Opportunity regulation at 24 CFR Part 130 applicable to HUD assisted construction contracts.

In the event of noncompliance by the Contractor with the nondiscrimination clauses of this Agreement or with any such rules, regulations, or orders of the Secretary of Labor, the Contract may be canceled, terminated or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contract or federally assisted construction contract procedures authorized in Executive Order 11246, or by rules, regulations, or orders of the Secretary of Labor, as otherwise provided by law.

41. Non Federal Labor-Standards Provisions

The following Massachusetts Labor-Standards Provisions, including the provisions concerning maximum hours of work, minimum rates of pay, and overtime compensation, with respect to the categories and classifications of employees hereinafter mentioned are included in this Contract pursuant to the requirements of applicable State or local laws. The inclusion of such provisions shall not be construed to relieve the Contractor or any Subcontractor from the pertinent requirements of any corresponding Federal Labor-Standards Provisions of this Contract.

42. Schedule of Salaries and Wages

The Contractor shall be responsible for complying with minimum wage rates and health and welfare fund contributions applicable to this Contract as determined by the Commonwealth of Massachusetts, Department of Labor and Workforce Development, Division of Occupational Safety, under the provisions of Massachusetts General Laws, Chapter 149, Sections 26 - 27D.

When both are applicable, the greater of Federal or State prevailing wages, which are attached in the Supplemental General Conditions, and incorporated herein by reference, shall be paid under this contract and reported by the submission of certified weekly payrolls to the Owner. The Contractor is responsible for compliance of this paragraph by its subcontractors.

The applicable federal and state prevailing wage rates are attached herein and incorporated by reference.

43. Labor Provisions

- 43.1 In the employment of mechanics and apprentices, teamsters, chauffeurs and laborers by the Contractor and Subcontractors, preference shall first be given to citizens of the Commonwealth who have been residents of the Commonwealth for at least six months at the commencement of their employment, who are veterans as defined in clause forty-third of MGL c. 4, s. 7 and who are qualified to perform the work to which the employment relates; and secondly, to citizens of the Commonwealth generally who have been residents of the Commonwealth for at least six months at the commencement of their employment, and if they cannot be obtained in sufficient numbers, then to citizens of the United States, in accord with MGL c. 149, s. 26.
- 43.2 The minimum rates of wages to be paid mechanics and apprentices, chauffeurs, teamsters and laborers shall be set forth in the schedule of rates of wages determined by the Commissioner of Labor and Industry unless the Federal rates are higher.
- 43.3 In accordance with MGL c. 149, s 34A, the Contractor shall, before commencing performance of the contract, provide by insurance for the payment of compensation and the furnishing of other benefits under M. G. L. c. 152 to all persons to be employed under the contract, and the Contractor shall continue such insurance in full force and effect during the term of the contract. Sufficient proof of compliance with this section must be furnished at the time of execution of this contract. Failure to provide and continue in force such insurance as aforesaid shall be deemed a material breach of the contract and shall operate as an immediate termination thereof. The attention of the Contractor is directed to that portion of G. L. c. 149, s. 34A which provides that whoever violates any of its provisions shall be punished by a fine of not more than one hundred dollars or by imprisonment for six months, or both; and, in addition, any Contractor who violates any provision of this section shall be prohibited from contracting, directly or indirectly, with the Commonwealth or any political subdivision thereof for the construction, alteration, demolition, maintenance or repair of, or addition to, any public works or public building for a period of two years from the date of conviction of said violation.
- 43.4 The Contractor shall pay to any reserve police officer employed by it the prevailing rate of wage paid to regular police officers, as required by MGL c. 149, s. 34B.

44. Environmental Requirements

The Contractor shall comply, where applicable, with: federal Executive Order 11988, Floodplain Management, May 24, 1977 (42 CFR 26951 et. seq.) particularly section 2 (a); the Coastal Zone Management Act of 1972 (16 U.S.C. 1451 et. seq.), as amended, particularly section 307 (c) and (d) (16 U.S.C. 1456 (c) and (d)); the Safe Water Drinking Act of 1974 (42 U.S.C. 201, 300 (f) et seq., and 21 U.S.C. 349), as amended; the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) as amended, particularly section 7 (16 U.S.C. 1536; the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271 et seq.) as amended, particularly section 7 (b) and (c) (16 U.S.C. 1278 (b) and (c)); the Clean Air Act (42 U.S.C. 7401 et seq.), as amended, particularly section 176 (c) and (d) (42 U.S.C. 7506 (c) and (d)); HUD Environmental Criteria and Standards (44 CFR 40860-

40866, July 12, 1979); "The American Standard Specification for Making Buildings and Facilities Accessible to and Usable by the Physically Handicapped," Number A- 117.4-R 1971, subject to the exceptions contained in 41 CFR 101-19-604; and any corresponding provisions of State and local laws and regulations. The Contractor shall also comply, where applicable, with the National Environmental Policy Act of 1969, Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, Flood Disaster Protection Act of 1973, National Flood Insurance Act of 1968, and Protection of Wetlands Laws.

45. "Right To Know" Law

As per requirements established by the United States Department of Labor Occupational Safety and Health Administration and in compliance with MGL c. 111F, Right to Know Law, it is required that all Material Safety Data Sheets accompany each initial product shipment where applicable, as well as a copy sent to the Grants Administrator, which will be forwarded to the Right-To-Know Coordinator for the City of Gardner.

46. Historic Preservation

The Contractor shall, in the performance of environmental assessments under the National Policy Act, and the Massachusetts Environmental Policy Act, comply with section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470), federal Executive Order 11593, and the Preservation of Archaeological and Historic Data Act of 1966 (17 U.S. C. 469 a- 1 et seq.), by (a) consulting with the State Historic Preservation Officer to identify properties listed in or eligible for inclusion in the National Register of Historic Places that are subject to adverse effects (see 36 CFR Part 800.8) by the proposed activity, and (b) complying with all requirements established by HUD to avoid or mitigate adverse effects upon such properties.

47. Compliance with Air and Water Acts (for contracts exceeding \$100,000)

By executing this Agreement, the Contractor hereby certifies and represents the following:

- A. No facility to be utilized in the performance of any nonexempt contract or subcontract, is not listed on the List of Violating Facilities issued by the Environmental Protection Agency (EPA) pursuant to 40 CFR 15.20.
- B. Compliance with all the requirements of Section 114 of the Clean Air Act, as amended, (42 USC 1857c-8) and Section 308 of the Federal Water Pollution Control Act, as amended, (33 USC 1318) relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder.

- C. Prompt notice shall be given to the Owner of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility utilized, or to be utilized for the Contract, is under consideration to be listed on the EPA List of Violating Facilities.
- D. The criteria and requirements in paragraphs A through D of this section shall be included in every nonexempt subcontract, and the Contractor shall take such actions as the Government may direct as a means of enforcing such provisions.

48. Special Conditions Pertaining to Hazards, Safety Standards and Accident Prevention

Lead-Based Paint Hazards (applicable to contracts for construction or rehabilitation of residential structures)

The construction or rehabilitation of residential structures is subject to the HUD-Lead-Based Paint regulations, 24 CFR Part 35. The Contractor and Subcontractors shall comply with the provisions for the elimination of lead-based paint hazards under sub-part B of said regulations.

The Owner will be responsible for the inspections and certification required under Section 35.14(f) thereof, and requirements of M.G.L. Ch.111, Sec. 190-191, and the regulations for Lead Poisoning.

49. Compliance with Mass. Community Development Block Grant Program Contract

All activities authorized by this Contract shall be subject to and performed in accordance with all applicable federal, state, and local laws and regulations, including but not limited to those cited within the said Agreement, and any applicable regulations issued by HUD published in 24 CFR Part 570, as may be amended from time to time, and any procedures and guidelines as may be established by Mass. CDBG for the Massachusetts Community Development Block Grant Program.

50. Interest of Contractor and Employees

The Contractor covenants that it presently has no interest and shall not acquire any interest, direct or indirect, in the study area or any parcels therein or any other interest which would conflict in any manner or degree with the performance of its services hereunder. The Contractor further covenants that in the performance of this contract, no person having any such interest shall be employed. Further, the Contractor shall adhere to the provisions of the Hatch Act (5 U.S.C. 1501 et seq.) which limits political activities by employees whose principal employment is in connection with an activity which is financed in whole or in part by federal funds.

51. Statement of Management, CPA Statement (for contracts in excess of \$100,000)

For contracts in excess of \$100,000 the Contractor shall file a statement with the Owner assuring that its system of auditing controls ensures management accountability and protection of assets as required by MGL c. 30, sec. 39R(c).

For such contracts, the Contractor shall file with a Owner a signed statement from a Certified Public Accountant that said CPA has examined the Statement of Management and opines whether the representations of management are consistent with its system of controls and its financial statements as set forth in MGL c. 30, sec. 39R(c).

52. Severability

If any provision of this Agreement is held invalid, the remainder of the Agreement shall not be affected thereby, and all other parts of this Agreement shall nevertheless be in full force and effect.

53. Availability of Funds

The payments provided under this Agreement are subject to the continued availability of state funds for the MassDevelopment Brownfields Redevelopment Fund and to the Owner's continued receipt of such funds.

54. Confidentiality

The Contractor shall protect the privacy of, and respect the confidentiality of information provided by, program participants, consistent with applicable federal and state regulations, and further shall comply with MGL c. 66, sec. 10, regarding access to public records.

55. MGL Chapter 30, Section 39P

The requirements of Massachusetts General Law, Chapter 30, Section 39P are hereby incorporated and made a part of this Agreement.

56. Compliance with Chapter 370 Acts of 1963

The contractor shall furnish all notices and shall do all work and be responsible for all requirements of Chapter 370 of the Acts of 1963, entitled "An Act Requiring a Contractor Making An Excavation In A Public Way to Give Notice Thereof to Public Utility Companies."

57. Foreign Corporations

Contractors and subcontractors incorporated outside of Massachusetts shall comply with MGL c. 30, sec. 39L and other applicable laws.

58. Construction

This Agreement shall be construed under the laws of the Commonwealth of Massachusetts.

59. Flood Disaster Protection

The owner of land subject to acquisition or improvement under this contract, and its successors or assigns, are hereby obligated to obtain and maintain, during ownership of the land which is the subject of this contract, such flood insurance as is required with respect to financial assistance for acquisition or construction purposed under section 102 (a) of the Flood Disaster Protection Act of 1973. This obligation is binding notwithstanding the fact that construction on the land which is the subject of this contract is not itself funding out of assistance provided under the Housing and Community Development Act of 1974, as amended.

MUNICIPAL CONTRACTS STATE ASSISTED BUILDING PROJECTS

APPENDIX to General Conditions of the Contract

GOALS FOR PARTICIPATION BY MINORITY BUSINESS ENTERPRISES (MBE) AND WOMEN BUSINESS ENTERPRISES (WBE) (EXECUTIVE ORDER 390, M.G.L. c. 7, s. 4)

The applicable goals for minority business enterprise (MBE) and woman business enterprise (WBE) participation established for this Contract are as follows:

Combined MBE/WBE: 10.4 % of the Construction Contract Price.

Combined MBE/WBE: 17.9 % of the Design Contract Price.

1. Goals

The goals for minority business enterprise (MBE) and woman business enterprise (WBE) participation established for this Contract are as set forth above and in the Owner - Contractor Agreement.

2. MBE/WBE Participation Credit

- A. If the Contractor is itself an MBE or a WBE, MBE/WBE participation credit shall be given in an amount equal to the entire Contract Price. If the Contractor is not an MBE or WBE, then MBE/WBE participation credit will be given for the value of the Work that is actually performed by each MBE or WBE subcontractor or sub-subcontractor.
- B. If the Contractor is a joint venture with one or more MBE/WBE joint ventures, MBE/WBE participation credit shall be given to the joint venture as follows:
 - (1) If the joint venture is certified by SOMBWA as an MBE or WBE, MBE/WBE Participation credit shall be given in an amount equal to the entire Contract Price.
 - (2) If the joint venture is not certified as an MBE or WBE by SOMWBA, MBE/WBE participation credit shall be given to the joint venture for the value of the Work that is performed by the MBE/WBE joint venture(s), and for the value of the Work that is actually performed by each MBE or WBE subcontractor or sub-subcontractor.
- C. If an MBE/WBE supplies, but does not install equipment or materials, MBE/WBE participation credit shall be given only if the MBE/WBE supplier is regularly engaged in sales of equipment or supplies to the construction industry from an established place of business. MBE/WBE participation credit shall be given the full amount of the purchase order only if the MBE/WBE supplier manufactures the goods or substantially alters them before resale. Otherwise, a contractor may count toward its MBE/WBE goal 60 percent of the total bid price for its expenditures of its materials and supplies required under a contract and obtained from a MBE/WBE regular supplier.

- D. MBE participation credit shall be given for the work performed by MBEs only, and WBE participation credit shall be given for the work performed by WBEs only. MBE participation may not be substituted for WBE participation, nor may WBE participation be substituted for MBE participation.

3. Establishing MBE/WBE Status.

- A. A minority owned business shall be considered as an MBE only if it has been certified as a minority business enterprise by the State Office of Minority and Women Business Assistance (“SOMWBA”).
- B. A woman owned business shall be considered as a WBE only if it has been certified as a woman business enterprise by SOMWBA.
- C. Certification as a disadvantaged business enterprise (“DBE”), certification as MBE/WBE by any agency other than SOMWBA, or submission of an application to SOMWBA for certification as an MBE/WBE shall not confer MBE/WBE status on a firm for the purposes of this Contract.

4. Subcontracts with MBE/WBEs

Within thirty (30) days after the award of this Contract, the Contractor shall (i) execute a subcontract with each MBE/WBE Subcontractor which has executed a Letter of Intent Approved by the Awarding Authority, (ii) cause its Subcontractors to execute a sub-subcontract with each MBE/WBE sub-subcontractor, and (iii) furnish the Awarding Authority with a signed copy of each such subcontract and sub-subcontract.

5. Performance of Contract Work by MBE/WBEs

- A. The Contractor shall not perform with its own organization or subcontract or assign to any other firm work designated to be performed by any MBE/WBE in the Letters of Intent or Schedule of MBE/WBE Participation without the prior Approval of the Awarding Authority, nor shall any MBE/WBE assign or subcontract to any other firm, or permit any other firm to perform any of its MBE/WBE Work without the prior Approval of the Awarding Authority. Any such unapproved assignment, subcontracting, sub-subcontracting, or performances of MBE/WBE Work by others shall be a change in the MBE/WBE Work for the purposes of this Contract. **THE AWARDED AUTHORITY WILL NOT APPLY TO THE MBE/WBE PARTICIPATION GOAL(S) ANY SUMS ATTRIBUTABLE TO SUCH UNAPPROVED ASSIGNMENTS, SUB-CONTRACTS, SUB-SUBCONTRACTS, OR PERFORMANCE OF MBE/WBE WORK BY OTHERS.**
- B. The Contractor shall be responsible for monitoring the performance of MBE/WBE Work to ensure that each scheduled MBE/WBE performs its own MBE/WBE Work with its own workforce.
- C. The Contractor and each MBE/WBE shall provide the Awarding Authority with all information and documentation that the Awarding Authority determines is necessary to ascertain whether or not an MBE/WBE has performed its own MBE/WBE Work. At the discretion of the Awarding Authority, failure to submit such documentation to the Awarding Authority shall establish conclusively for the purpose of giving MBE/WBE participation credit under this Contract that such MBE/WBE did not perform such work.
- D. With each progress payment request submitted by the Contractor to the Awarding Authority, the Contractor must provide the Contractor Progress Payment Report indicating the value of payments for each MBE and WBE firms for that period.

6. Notification of Changes in MBE/WBE Work

- A. If at any time during the performance of the Contract the Contractor determines or has reason to believe that a scheduled MBE/WBE is unable or unwilling to perform its MBE/WBE Work, or that there has been or will be a change in any MBE/WBE Work, or that the Contractor will be unable to meet the MBE/WBE participation goal(s) for this Contract for any reason, the Contractor shall immediately notify the Awarding Authority Contract Compliance Office in writing of such circumstances.
- B. Any notice of a change in MBE/WBE Work pursuant to subparagraph “A” above shall include a revised Schedule of MBE/WBE Participation, and additional or amended Letters of Intent and subcontracts, as the case may be.

7. Actions required if there is a Reduction in MBE/WBE Participation

- A. In the event there is a change or reduction in any MBE/WBE Work which will result in the Contractor failing to meet the MBE/WBE participation goal(s) for this Contract, other than a reduction in MBE/WBE Work resulting from a Change Order initiated by the Awarding Authority, then the Contractor shall immediately undertake a diligent, good faith effort to make up the shortfall in MBE/WBE participation as follows:
 - (1) The Contractor shall identify all items of the Work remaining to be performed under the Contract that may be made available for subcontracting to MBE/WBEs. The Contractor shall send a list of such items of work to the Awarding Authority, together with a list of the remaining items of the Work that was not made available to MBE/WBEs and the reason for not making such work available for subcontracting to MBE/WBEs.
 - (2) The Contractor shall send written notices soliciting proposals to perform the items of the Work that may be made available for subcontracting to MBE/WBEs to all MBE/WBEs qualified to perform such work. The Contractor shall advise the Awarding Authority of (i) each MBE/WBE solicited, and (ii) each MBE/WBE listed in the SOMWBA directory under the applicable trade category that was not solicited and the reasons therefore. The Contractor shall also advise the Awarding Authority of the dates notices were mailed and provide a copy of the written notice(s) sent.
 - (3) The Contractor shall make reasonable efforts to follow up the written notices sent to MBE/WBEs with telephone calls or personal visits in order to determine with certainty whether the MBE/WBEs were interested in performing the work. Phone logs or other documentation must be submitted to the Awarding Authority evidencing this effort.
 - (4) The Contractor shall make reasonable efforts to assist MBE/WBEs that need assistance in obtaining insurance, bonds, or lines of credit in order to perform work under the Contract, and shall provide the Awarding Authority with evidence that such efforts were made.

- (5) The Contractor shall provide the Awarding Authority with a statement of the response received from each MBE/WBE solicited, including the reason for rejecting any MBE/WBE who submitted a proposal.
- (6) The Contractor shall take any additional measures reasonably requested by the Awarding Authority to meet the MBE/WBE participation goal(s) established for this Contract, including, without limitation, placing advertisements in appropriate media and trade association publications announcing the Contractor's interest in obtaining proposals from MBE/WBEs, and/or sending written notification to MBE/WBE economic development assistance agencies, trade groups and other organizations notifying them of the project and of the work available to be subcontracted by the Contractor to MBE/WBEs.

B. If the Contractor is unable to meet the MBE/WBE participation goals for this Contract after complying fully with each of the requirements of paragraph "A" above, and the Contractor is otherwise in full compliance with the terms of this Article, the Awarding Authority may reduce the MBE/WBE participation goals for this Contract to the extent that such goals cannot be achieved.

8. Suspension of Payment and/or Performance for Noncompliance.

A. If at any time during the performance of this Contract, the Awarding Authority determines or has reason to believe that (1) there has been a change or reduction in any MBE/WBE Work which will result in the Contractor failing to meet the MBE/WBE participation goal(s) for this Contract, other than a reduction in MBE/WBE Work resulting from a change in the Contract work ordered by the Awarding Authority, and (2) the Contractor has failed to comply fully with all of the terms and conditions of paragraphs 1 through 7 above, the Awarding Authority may:

- (1) Suspend payment to the Contractor of an amount equal to the value of the work which was to have been performed by an MBE/WBE pursuant to the Contractor's Schedule of MBE/WBE Participation but which was not so performed, in order to ensure that sufficient Contract funds will be available if liquidated damages are assessed pursuant to paragraph 9, and/or

- (2) Suspend the Contractor's performance of this Contract in whole or in part.

B. The Awarding Authority shall give the Contractor prompt written notice of any action taken pursuant to paragraph A above and shall give the Contractor and any other interested party, including any MBE/WBEs, an opportunity to present evidence to the Awarding Authority that the Contractor is in compliance with the requirements of this Article, or that there is some justifiable reason for waiving the requirements of this Article in whole or in part. The Awarding Authority may invite SOMWBA to participate in any proceedings undertaken pursuant to this paragraph.

C. Upon a showing that the Contractor is in full compliance with the requirements of this Article, or that the Contractor has met or will meet the MBE/WBE participation goals for this Contract, the Awarding Authority shall release any funds withheld pursuant to clause A (1) above, and lift any suspension of the Contractor's performance under clause A (2) above.

9. Liquidated Damages; Termination

- A. If payment by the Awarding Authority or performance by the Contractor is suspended by the Awarding Authority as provided in paragraph 8 above, the Awarding Authority shall have the following rights and remedies if the Contractor thereafter fails to take all action necessary to bring the Contractor into full compliance with the requirements of this Article, or if full compliance is no longer possible because the default of the Contractor is no longer susceptible to cure, if the Contractor fails to take such other action as may be required by the Awarding Authority to meet the MBE/WBE participation goals set forth in this Contract:
- (1) The Awarding Authority may terminate this Contract, and/or
 - (2) The Awarding Authority may retain from final payment to the Contractor, as liquidated damages, an amount equal to the difference between:
 - (a) The total of the MBE/WBE participation goals set forth in this Contract, and;
 - (b) The amount of MBE/WBE participation credit earned by the Contractor for MBE/WBE Work performed under this Contract as determined by the Awarding Authority, the parties agreeing that the damages for failure to meet the MBE/WBE participation goals are difficult to determine and that the foregoing amount to be retained by the Awarding Authority represents the parties' best estimate of such damages. Any liquidated damages will be assessed separately for MBE and WBE participation.
- B. Before exercising its rights and remedies hereunder, the Awarding Authority may give the Contractor and any other interested party another opportunity to present evidence to the Awarding Authority that the Contractor is in compliance with the requirements of this Article or that there is some justifiable reason for waiving the requirements of this Article in whole or in part. The Awarding Authority may invite SOMWBA to participate in any proceedings undertaken hereunder.

10. Reporting Requirements

The Contractor shall submit to the Awarding Authority all information or documentation that is necessary in the judgment of the Awarding Authority to ascertain whether or not the Contractor has complied with any of the provisions of this Article.

11. Awarding Authority's Right to Waive Provisions of this Article in Whole or In Part

The Awarding Authority reserves the right to waive any provision or requirement of this Article if the Awarding Authority determines that such waiver is justified and in the public interest. No such waiver shall be effective unless in writing and signed by a representative of the Awarding Authority's Affirmative Marketing Construction Officer (AMCO) or the office of its General Counsel. No other action or inaction by the Awarding Authority shall be construed as a waiver of any provision of this Article.

EXHIBIT A**SCHEDULE FOR PARTICIPATION
BY MINORITY/WOMEN BUSINESS ENTERPRISES**

Project Number _____

Project Location _____

Project Name _____

A. Filed Sub-bidders utilizing MBE/WBE firms, and MBE/WBE Sub-bidders - attach to Filed Sub-bid.**B. General Contractor must submit to the Awarding Authority within five (5) working days of the opening of General Bids.****BIDDER CERTIFICATION:**

The Bidder agrees that if awarded the contract it will expend at least the amount of the contract set forth below for MBE/WBE participation. For purposes of this commitment, the MBE and WBE designation means that a business has been certified by SOMWBA as either a MBE, WBE or MBE/WBE. The Bidder must indicate the MBE/WBE firms it intends to utilize on the project as follows (attach additional sheets if necessary):

Company Name & Address	MBE or WBE	Describe MBE/WBE Scopes of Work (clarify "Labor Only", "Material Only" or "Labor and Material")	If Supplier, Indicate Total Value of Supplies (60% of Total Counts toward Participation)	Total Dollar Value of Participation
1.				
2.				
3.				
4.				
5.				

MBE Goal: \$ _____

Total Dollar Value of MBE Commitment: \$ _____

WBE Goal: \$ _____

Total Dollar Value of WBE Commitment: \$ _____

The undersigned hereby certifies that he/she has read the terms and conditions of the contract with regard to MBE/WBE participation and is authorized to bind the Bidder to the commitment set forth above.

Name of Firm _____

Business Address _____

Print Name _____

Authorized Signature _____

Title _____

Telephone No. _____

Fax No. _____

Date _____

EXHIBIT B**LETTER OF INTENT
MINORITY/WOMEN BUSINESS ENTERPRISES PARTICIPATION**

(To be completed by MBE/WBE, and submitted by the General Bidder to the Municipal Affirmative Marketing Construction Officer (AMCO) within five (5) working days of the opening of General Bids or by Filed Sub-bidder with its bid.)

Project Number _____

Project Name _____

Project Location _____

To _____

Name of General Bidder/Sub-bidder _____

Indicate SOMWBA Certification:

_____ MBE

_____ WBE

_____ M/WBE

1. This firm intends to perform work in connection with the above project.
2. This firm is currently certified by SOMWBA to perform the work identified below, and has not changed its minority/women ownership, control, or management without notifying SOMWBA within thirty (30) days of such a change.
3. This firm understands that if the General Bidder/Sub-bidder referenced above is awarded the contract, the Bidder intends to enter into an agreement with this firm to perform the activity described below for the prices indicated. This firm also understands that the above-referenced firm, as General Bidder/Sub-Bidder, will make substitutions only as allowed by the terms of the Contract.
4. This firm understands that under the terms of the contract, only work actually performed by an MBE/WBE will be credited toward MBE/WBE participation goals, and this firm cannot assign or subcontract out any of its work without prior written approval of the Awarding Authority, and that any such assignment or subcontracting will not be credited toward MBE/WBE participation goals.

MBE/WBE PARTICIPATION

Section/Item Number (If Applicable)	Describe MBE/WBE Scopes of Work (Clarify "Labor Only", "Material Only" or "Labor and Material")	If Supplier, Indicate Total Value of Supplies (60% of Total Counts Toward Participation)	Dollar Value of Participation

Total Dollar Value: \$ _____

Name of MBE/WBE Firm _____

Business Address _____

Print Name _____

Authorized Signature _____

Title _____

Telephone No. _____ Fax No. _____

Date _____

EXHIBIT C**CONTRACTOR PROGRESS PAYMENT REPORT
MINORITY/WOMEN BUSINESS ENTERPRISES PARTICIPATION****Project Number:** _____**Project Name:** _____**Project Location:** _____**Date:** _____**Periodical Payment No.:** _____**General Contractor:** _____**MBE and/or WBE:** _____

One copy of this report is to be submitted for each Minority Business Enterprise (MBE) and/or Women Business Enterprise (WBE) at the time of submitting a request for payment. Copies of the report must be sent to the Minority Business Enterprise (MBE) and/or Women Business Enterprise (WBE) named above and to the municipalities Affirmative Marketing Construction Officer (AMCO). The AMCO will forward a copy of each Contractor Progress Payment Report to SOMWBA on a quarterly basis.

1. The total price to be paid to the above-named Minority Business Enterprise _____ and/or Women Business Enterprise _____:
\$ _____
2. The amount remitted to the Minority Business Enterprise and/or Women Business Enterprise as of the above date for work performed under this project: \$ _____
3. Balance due the Minority Business Enterprise and/or Women Business Enterprise as of the above date for work performed under the above-named project: \$ _____

Comments or explanation of amounts indicated under items 1 and 2 above:

4. We hereby certify that the information supplied herein (including pages attached) is correct and complete.

General Contractor:**Minority and/or Women Business Enterprise**_____
(Signed)_____
(Signed)_____
(Title)_____
(Title)_____
(Date)_____
(Date)

SECTION 00800

SUPPLEMENTARY CONDITIONS

SUPPLEMENTAL GENERAL CONDITIONS - INDEX

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SUPPLEMENTAL GENERAL CONDITIONS

1. Scope of Work

The Scope of Work for the Project shall include, but not be limited to, any and all work described in the Contract Documents including the Invitation to Bid, Information for Bidders, printed form of Contract, General Conditions, Supplemental General Conditions, Special Conditions, Specifications, Plans and Drawings, together with any attachments or appendices, for the Theater Park and Parking Lot Redevelopment Project.

2. Notice To Proceed & Pre-Construction Conference

A written Notice to Proceed shall be issued to the Contractor after receipt by the Owner of the following: (1) proof of required insurance, (2) verification that EEO poster has been posted in a conspicuous place at the job site, (3) posting of EEO Coordinator, federal wage decisions, and state prevailing wage rates in a conspicuous place at the job site, (4) Contractor's Certification Concerning Labor Standards and Prevailing Wage Requirements, and (5) Subcontractor's Certification Concerning Labor Standards and Prevailing Wage Requirements. No work shall be performed by the Contractor prior to receipt of the Notice to Proceed.

Prior to the start of construction, the Contractor, all subcontractors, the Engineer, and the Owner shall attend a pre-construction conference. The conference will serve to acquaint the participants with the general plan of contract administration and requirements under which the construction operation is to proceed, and will inform the Contractor, in detail, of the obligations imposed on it and its subcontractors by the Executive Orders concerning Equal Employment Opportunity and Davis-Bacon Act requirements and other federal and state labor standards requirements.

The Owner shall inform the Contractor of the date, time, and place of the pre-construction conference.

3. Schedule of Work

At the Pre-Construction Conference, the Contractor shall submit to the Owner and Engineer three copies of a bar chart with the schedule and sequence in which the construction work shall be prosecuted. No work shall commence until the Owner has approved, in writing, of the schedule and sequence of operations.

The Contractor shall be responsible for keeping public ways open and in a passable condition at all times, and for maintaining access at all times to all abutting properties.

4. Project Sign

The Contractor shall furnish, erect and maintain a Project Sign to be located at the Project Site during the duration of the contract. The sign shall be constructed of four-foot by eight-foot (4' x 8') medium density overlay plywood which shall bear a legend consisting of black lettering on white background in substantially the following manner (may not be to scale):

**THEATER PARK AND
PARKING LOT REDEVELOPMENT**

funded in part by the
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
MASSACHUSETTS COMMUNITY DEVELOPMENT BLOCK GRANT

Charles D. Baker, Governor
Karyn E. Polito, Lt. Governor
Chrystal Kornegay, Undersecretary



and the
CITY OF GARDNER
DEPARTMENT OF COMMUNITY DEVELOPMENT AND PLANNING

Mark P. Hawke, Mayor
Trevor M. Beauregard, Director DCDP

5. Environmental Protection

The Contractor shall adhere to all federal, state and local regulations, including any orders of conditions which may be attached hereto. Additionally, the Contractor shall conform to the following:

A. Plant and Pest Control

Where applicable, all soil moving equipment that has operated in, or will operate in, regulated areas shall be subject to plant quarantine regulations. In general, these regulations require the thorough cleaning of soil from equipment before such equipment is moved from regulated areas to uninfested areas.

Complete information may be obtained from the Massachusetts Dept. of Agriculture, Plant Pest Control Division, 100 Cambridge St., Boston, MA (Tele: 617-727-3031); and for information concerning the interstate movement of soil moving equipment: U.S. Dept. of Agriculture, Plant Pest Control Division, 424 Trapelo Rd., Waltham, MA.

Premises must be certified as free from vermin by a licensed extermination professional prior to issuance of the demolition permit.

B. Prevention of Water Pollution

The Contractor shall take such precautions as may be necessary to avoid contaminating water in adjacent water courses, or water storage areas, whether natural or man-made. All earth work, movement of equipment, water control of excavations or foundation areas, and other operations likely to increase silting, shall be conducted so as to avoid pollution of such water courses or water storage areas.

The Contractor shall construct silt retention filters in any such area, which filters shall be removed upon completion of the work. Water used during performance of the Contract which has become contaminated with oil, bitumen, harmful or objectionable chemicals, sewage or other pollutants shall be discharged so as to avoid affecting nearby water.

Under no circumstances shall the Contractor discharge pollutants directly into any water course or water storage area. When water from adjacent natural water sources is used in the Contract work, intake methods shall be such as to avoid contaminating the source of supply.

C. Air Pollution and Dust Control

The Contractor shall conduct its operations in accordance with federal, state and local regulations governing air pollution.

The Contractor is hereby placed on notice that blowing dust from unstabilized earth areas of the work shall be considered a nuisance under its control. Contractor shall, by spraying with water or other approved means, dampen the soil to hold down the dust. During working hours and before leaving the Project site for the evening, weekends, or other extended period, the Contractor shall assess the moisture content of the soil and dampen same to the extent necessary to hold down the dust. While work is suspended, Contractor shall, if directed by the Engineer, return to the site to maintain dust control.

6. Cooperation of Contractor

The Contractor's attention is directed to the fact that other contractors under separate contracts may be entering upon the work site for the construction of other proposed amenities. The Contractor shall complete its work in cooperation with other contractors so as to cause the least interference with same, and shall have no claim for any delay which may be due to, or result from, said work of these contractors.

7. Record Drawings – As-Builts

The Contractor shall cooperate with the Engineer and shall prepare and maintain a set of drawings on which shall be recorded accurately, as the work progresses, the actual "as built" locations and dimensions of his work, indicating thereon all variations from the Contract Drawings. Prior to final acceptance of the work, all "as built" data shall be transferred to a complete set of reproducible record drawings in ink. This work shall be performed by the Contractor's Registered Land Surveyor with the cooperation of the Contractor as required. After review and approval by the Engineer of the record drawings shall be completed and delivered to the Owner.

8. Photographs

The Contractor shall be required to furnish five (5) views of before, during, and after photographs of the site conditions. The Contractor is encouraged to submit “during” photographs, with negatives that shall become the property of the City, along with each pay requisition to facilitate approvals.

9. Utilities

The Contractor shall obtain and shall pay for all licenses and permits that are required by the City or any other agencies that may be involved. The Contractor shall comply with all codes, regulations, and standards of the City.

“DIG SAFE”, the City, and all private companies or agencies whose utilities are in the construction, shall be notified by the Contractor at least 72 hours prior to the start of any excavation. The Contractor shall be required to cooperate with the utility companies involved in order to assure completion of all work with the least amount of delay.

10. Provisions for Traffic/Police Details

The Contractor shall not obstruct or close any portion of a street without obtaining the necessary permits from the proper municipal authorities. If any street or private way shall be rendered unsafe by the Contractor operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the Owner.

Streets, roads, private ways, and walks shall be maintained passable by the Contractor at his expense. The Contractor shall assume full responsibility for the adequacy and safety of provisions made. He shall conduct his construction operations such that interference with the flow of traffic will be held to a minimum.

The Contractor shall cooperate in every possible way with the municipal authorities to maintain a flow of traffic through the site. The Contractor shall notify the Fire Department, Police Department, School Bus Company, and the Highway Department when any street is to be closed regardless of the length of time or time of day. The Contractor shall also be responsible for the arrangement of police details as required by the City. The Contractor will be compensated for payment of police detail costs, including applicable administrative fees in accordance with Section 01270 of these specifications.

All detours shall be signed and lighted as directed by the Engineer.

11. Abandonment of Project

If the Contractor abandons the work, or any portion of the work, or sublets without prior written consent by the Owner, or assigns any claim thereunder other than as herein required, or if at any time the Owner shall certify in writing that the rate of progress is inadequate, or that the work or any part thereof is unnecessarily or unreasonably delayed, or that the contractor has violated any of the provisions of this Contract, then the Owner, in its sole discretion may notify the contractor by written order, with a copy mailed to the Surety, to discontinue all work, or any part thereof.

Thereupon the contractor shall discontinue such work or such part thereof as the Owner may designate. The Owner may complete the work, or such part thereof, and charge the entire expense of so completing to the Contractor. The Owner may take possession of any facilities, equipment, materials, temporary works, machinery, implements, and tools of every description as may be found at the location of said work. The Owner reserves the right at all times to demand the Contractor's Surety to complete the work in accordance with the performance bond.

Any costs under this article shall be deducted and paid by the Owner out of any funds then due, or to become due, the Contractor under this Agreement. In such accounting the Owner shall not be held to obtain the lowest figures for the work of completing the Contract or any part thereof, or insuring its proper completion but all sums actually paid thereof shall be charged to the contractor.

If the expenses so charged are less than the sum which would have been payable under this Contract if the same had been completed by the Contractor, the Contractor shall be entitled to receive the difference; and if such expenses shall exceed the said sum, the Contractor shall pay the amount of the excess to the Owner.

12. Contractor to Pay All Labor, Etc.

The Contractor shall pay for all labor performed or furnished, and for all material and equipment used or employed, for the performance of this Contract. The Contractor shall furnish the Owner, upon request, with evidence satisfactory to the Owner that all persons who have performed work or furnished supplies, materials and/or equipment under this Contract, and all other claims for damage of any kind caused by or arising from the construction of said work have been fully paid or satisfactorily secured. If satisfactory evidence is not furnished, the Owner may retain appropriate amounts from any amount due the Contractor sufficient to cover any such unpaid claims.

13. Laws and Regulations

The Contractor shall keep itself fully informed of all municipal, state and federal laws and regulations which may affect those engaged or employed in the work, or the materials used in the work, or in any way affecting the conduct of the work hereunder. Should any discrepancy or inconsistency be discovered in the Contract Documents in relation to any such law, ordinance, regulation, order or decree, the Contractor shall forthwith report the same to the Owner in writing. Contractor shall at all times observe and comply with, and shall cause all its agents and employees to comply with all such existing and future laws, ordinances, regulations, orders and decrees; and shall protect and indemnify the Owner and its officers and agents against any claim or liability arising from or based on the violations of any such law, ordinance, regulation, order or decree, whether by itself, its employees or its agents.

14. Provisions Required by Law Deemed Inserted

Any provision of law or clause required by law to be inserted in this Agreement shall be deemed to be inserted herein.

15. Payment Procedures, Retainage

The Contractor shall submit a monthly written request for payment to the Engineer which estimates the total amount of work complete and materials delivered through the date of such estimate. The Engineer shall review such request and make any adjustments to the estimated amounts therein as deemed appropriate for approval of and payment by the Owner within thirty-five (35) days from such approval.

The Owner shall retain five percent (5%) of such approved payment as partial security for the fulfillment of the Contract by the Contractor. In addition to the five percent (5%) retainage, additional amounts to cover any specific claims against the Contractor which have been identified may be withheld. The Owner reserves the right to verify that such payments are first applied to the payment of labor performed or employed, and materials supplied under the Contract. The requirements of MGL c. 30, §§ 39G and 39K are incorporated herein by reference.

Issuance of final payment and release of all retained funds shall be made in accordance with General Conditions Article 27.

16. Payment to Subcontractors

The Contractor shall comply with the following statutory provisions pursuant to MGL Chapter 149, Sections 44A to L, as applicable. For contracts awarded under MGL Chapter 30, Section 39M, subparagraphs (a) through (h) shall apply.

- A. Forthwith after the general contractor receives payment on account of a periodic estimate, the general contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by the subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.
- B. Not later than the sixty-fifth (65th) day after each subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the subcontract less amounts retained by the awarding Authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the awarding authority shall pay that amount to the general contractor. The general contractor shall forthwith pay to the subcontractor the full amount received from the awarding authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.
- C. Each payment made by the awarding authority to the general contractor pursuant to subparagraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a subcontractor shall be made to the general contractor for the account of that subcontractor; and the awarding authority shall take reasonable steps to compel the general contractor to make each such payment to each such subcontractor. If the awarding authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the general contractor or

which is to be included in a payment to the general contractor for payment to the subcontractor as provided in subparagraphs (a) and (b), the awarding authority shall act upon the demand as provided in this section.

- D. If, within seventy (70) days after the subcontractor has substantially completed the subcontract work, the subcontractor has not received from the general contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the subcontractor may demand direct payment of that balance from the awarding authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the awarding authority, and a copy shall be delivered to or sent by certified mail to the general contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth (70th) day after the subcontractor has substantially completed the subcontract work. Within ten (10) days after the subcontractor has delivered or so mailed the demand to the awarding authority and delivered or so mailed a copy to the general contractor, the general contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the awarding authority and a copy shall be delivered to or sent by certified mail to the subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor and of the amount due for each claim made by the general contractor against the subcontractor.
- E. Within fifteen (15) days after receipt of the demand by the awarding authority, but in no event prior to the seventieth (70th) day after substantial completion of the subcontract work, the awarding authority shall make direct payment to the subcontractor of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount (i) retained by the awarding authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceeding barring such payment, or (iii) disputed by the general contractor in the sworn reply; provided, that the awarding authority shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The awarding authority shall make further direct payments to the subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.
- F. The awarding authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of the subparagraph (e) in an interest-bearing joint account in the names of the general contractor and the subcontractor in a bank in Massachusetts selected by the awarding authority or agreed upon by the general contractor and the subcontractor and shall notify the general contractor and the subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an

agreement between the general contractor and the subcontractor or as determined by the decree of a court of competent jurisdiction.

- G. All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (f) shall be made out of amounts payable to the general contractor at the time of receipt of a demand for direct payment from a subcontractor and out of amounts which later become payable to the general contractor and in the order of receipt of such demands from subcontractors. All direct payments shall discharge the obligation of the awarding authority to the general contractor to the extent of such payment.
- H. The awarding authority shall deduct from payments to a general contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from subcontractors. All such amounts shall be earmarked for such direct payments, and the subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the general contractor.
- I. If the subcontractor does not receive payment as provided in subparagraph (a) or if the general contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the subcontractor and the subcontractor does not receive payment for same when due less the deductions provided for in subparagraph (a), the subcontractor may demand direct payment by following the procedure in subparagraph (d) and the general contractor may file a sworn reply as provided in that same subparagraph. A demand made after the first day of the month following that for which the subcontractor performed or furnished the labor and materials for which the subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the general contractor. Thereafter the awarding authority shall proceed as provided in subparagraph (d), (f), (g), and (h). MGL Ch. 30, sec. 39F.

17. Termination

Force Majeure. Neither party shall be liable to the other or deemed to be in breach under the Contract for any failure to perform, including, without limitation, a delay in rendering performance due to causes beyond its reasonable control such as an order, injunction, judgment, or determination of any Court of the United States or the Commonwealth of Massachusetts, an Act of God, war, civil disobedience, extraordinary weather conditions, labor disputes, or shortages, or fluctuation in electric power, heat, light, or air conditioning. Dates or time of performance shall be extended automatically to the extent of such delays, provided that the party whose performance is affected promptly notifies the other of the existence and nature of such delay.

Performance Dates. It is agreed, however, that since the performance dates of the Contract are important, continued failure to perform for periods aggregating sixty (60) days or more, even for causes beyond the control of the contractor, shall be deemed to render performance impossible and the City shall thereafter have the right to terminate the Contract in accordance with the provisions of the above.

Delay or Hindrance. The contractor shall have no damages for delay or hindrance. In the event of delay or hindrance not the fault of the contractor, an extension of time shall be the contractor's sole remedy.

Incomplete Performance. In the event of termination, the Contractor shall deliver to the Owner all finished work and documentation, complete and incomplete. The contractor shall be entitled to receive payment for any work performed and accepted under the Contract which was completed prior to the date of termination. In the event of termination the Contractor shall have no right to payment for lost profits or other consequential damages.

Termination for Convenience. Notwithstanding any other provision of the Contract, the City reserves the right at any time in its absolute discretion to suspend or terminate the Contract in whole or in part for its convenience upon written notice of the contractor. If any portion of the Contract so suspended is not recommenced by written notice of the City within the time period specified in the written notice of suspension, the suspended portion of the Contract shall thereupon be deemed terminated as to that portion for the convenience of the City in accordance with this provision. The City shall incur no liability by reason of such termination for convenience, except for the obligation to pay for work performed and accepted and for reimbursable expenses accrued through the date of termination less any offset or claim of the Owner. Such obligation shall not exceed the available appropriation. The contractor shall have no right to recover other amounts, including but not limited to amounts for lost profits, or consequential damages.

Inadequate Funds. In the event that all or a portion of the project is postponed or terminated due to inadequate federal, state, or local funds, the provisions set forth in the above paragraph (Termination for Convenience) shall apply.

Termination Cause. If, after the notice of termination cause, it is determined that said cause was invalid, the termination shall be deemed to have been effected for the convenience of the City.

Any termination or suspension of the Agreement shall not impair the City's right to recover damages occasioned by the fault of the contractor. Any suspension shall not limit the right of the City to terminate this Agreement.

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part

of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been

communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who

is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be

awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

General Decision Number: MA180002 08/10/2018 MA2

Superseded General Decision Number: MA20170002

State: Massachusetts

Construction Types: Heavy (Heavy and Dredging)
HEAVY CONSTRUCTION PROJECTS; AND
MARINE CONSTRUCTION PROJECTS

County: Worcester County in Massachusetts.

HEAVY CONSTRUCTION PROJECTS; AND MARINE CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018
1	01/12/2018
2	02/16/2018
3	02/23/2018
4	03/23/2018
5	03/30/2018
6	05/25/2018
7	06/22/2018
8	07/06/2018
9	08/10/2018

ASBE0006-005 09/01/2017

	Rates	Fringes
Insulator/asbestos worker		
Includes the application		
of all insulating		
materials, protective		
coverings, coating, and		
finishes to all types of		
mechanical systems.....	\$ 41.48	27.50

BOIL0029-001 01/01/2017

	Rates	Fringes
BOILERMAKER.....	\$ 42.42	24.92

BRMA0001-002 03/01/2018

SPRINGFIELD/PITTSFIELD CHAPTER WORCESTER (Warren County)

	Rates	Fringes
Bricklayer, Cement Mason, Plasterer & Stonemason.....	\$ 40.56	30.47

BRMA0001-014 03/01/2018

WORCESTER CHAPTER

WORCESTER (Auburn Barre, Blackstone, Berlin, Bolton, Boylston, the Brookfields, Charlton, Clinton, Douglas, Dudley, Grafton, Hardwick, Holden, Leicester, Mendon, Millbury, Milville, New Braintree, Northboro, Northbridge, Oakham, Oxford, Paxton, Rutland, Shrewbury, Southbridge, Spencer, Sturbridge, Sutton, Upton, Uxbridge, Webster, Westboro, West Boylston, Worcester)

	Rates	Fringes
Bricklayer, Cement Mason, Plasterer & Stonemason.....	\$ 49.96	32.19

BRMA0001-015 03/01/2018

LOWELL CHAPTER

WORCESTER (Hopedale, Milford, Southboro)

	Rates	Fringes
Bricklayer, Cement Mason, Plasterer & Stonemason.....	\$ 49.96	32.19

BRMA0001-023 03/01/2018

LOWELL CHAPTER

WORCESTER (Ashburham, Athol, Fitchburg, Gardner, Harvard, Hubbardston, Lancaster, Leominster, Lunenburg, Petersham, Phillipston, Princeton, Royalston, Sterling, Templeton, Westminster, Winchendon)

	Rates	Fringes
Bricklayer, Cement Mason, Plasterer & Stonemason.....	\$ 49.96	32.19

* BRMA0003-001 08/01/2018

	Rates	Fringes
Marble & Tile Finisher.....	\$ 40.40	29.94
Marble, Tile & Terrazzo Workers.....	\$ 52.95	31.83
TERRAZZO FINISHER.....	\$ 51.85	31.67

CARP0056-004 08/01/2015

	Rates	Fringes
DIVER TENDER.....	\$ 42.04	29.73
DIVER.....	\$ 58.86	29.73

CARP0056-008 08/01/2015

	Rates	Fringes
PILEDRIVERMAN.....	\$ 42.04	29.73

CARP0107-002 09/01/2017		

WORCESTER (Except Gilbertville, Harwick, Warren, West Brookfield)

	Rates	Fringes
Carpenter/Lather.....	\$ 39.28	27.90

CARP0108-001 09/04/2017		

WORCESTER (Gilbertville, Hardwick, Warren, West Brookfield)

	Rates	Fringes
Carpenter/Lather.....	\$ 35.56	23.76

CARP1121-001 10/01/2017		

	Rates	Fringes
MILLWRIGHT.....	\$ 39.52	30.85

ELEC0096-002 06/01/2018		

WORCESTER (Warren)

	Rates	Fringes
ELECTRICIAN.....	\$ 42.32	11%+21.66

ELEC0104-001 09/03/2017		

	Rates	Fringes
Line Construction:		
Cableman.....	\$ 38.45	18.42+A
Equipment Operator.....	\$ 38.45	22.50+A
Groundman.....	\$ 24.88	10.24+A
Lineman.....	\$ 45.23	25.71+A

A. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Christmas Day and Columbus Day, provided the employee has been employed 5 working days prior to any one of the listed holidays.

ELEV0041-002 01/01/2018

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 51.46	32.645+a+b

FOOTNOTE:

a. Vacation: 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.

b. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence

Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

ENGI0004-003 12/01/2017

WORCESTER (Except Athol, Barre, Brookfield, East Brookfield, Hardwick, New Braintree, North Brookfield, Oakham, Petersham, Phillipston, Royalston, Strutbridge, Templeton, Warren, West Brookfield, Winchendon)

	Rates	Fringes
Power equipment operators:		
BUILDING, HEAVY & MARINE		
GROUP 1.....	\$ 46.63	26.90+A
GROUP 2.....	\$ 46.17	26.90+A
GROUP 3.....	\$ 31.80	26.90+A
GROUP 4.....	\$ 38.57	26.90+A
GROUP 5.....	\$ 23.24	26.90+A
GROUP 6.....	\$ 27.40	26.90+A

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day

HOURLY PREMIUM FOR BOOM LENGTHS (Including Jib):

Over 150 ft.	+2.12
Over 185 ft.	+3.72
Over 210 ft.	+5.23
Over 250 ft.	+7.92
Over 295 ft.	+10.97
Over 350 ft.	+12.76

POWER EQUIPMENT OPERATORS CLASSIFICATIONS BUILDING AND HEAVY CONSTRUCTION

GROUP 1: Power shovel; crane; truck crane; derrick; pile driver; trenching machine; mechanical hoist pavement breaker; cement concrete paver; dragline; hoisting engine; three drum machine; pumpcrete machine; loaders; shovel dozer; front end loader; mucking machine; shaft hoist; steam engine; backhoe; gradall; cable way; fork lift; cherry picker; boring machine; rotary drill; post hole hammer; port hole digger; asphalt plant on job site; concrete batching and/or mixing plant on job site; crusher plant on job site; paving concrete mixer; timber jack

GROUP 2: Sonic or vibratory hammer; grader; scraper; tandem scraper; bulldozer; tractor; mechanic - maintenance; York rake; mulching machine; paving screed machine; stationary steam boiler; paving concrete finishing machine; grout pump; portable steam boiler; portable steam generator; roller; spreader; asphalt paver; locomotives or machines used in place thereof; tamper (self propelled or tractor-draw); cal tracks; ballast regulator; rail anchor machine; switch tamper; tire truck

GROUP 3: Pumps (1-3 grouped); compressor; welding machines (1-3 grouped); generator; sighting plant; heaters (power driven, 1- 5); syphon-pulsometer; concrete mixer; valves controlling permanent plant air steam, conveyor, wellpoint system (operating)

GROUP 4: Assitant engineer (fireman)

GROUP 5: Oiler (other than truck cranes and gradalls)

GROUP 6: Oiler (on truck cranes and gradalls)

POWER EQUIPMENT OPERATORS CLASSIFICATIONS MARINE CONSTRUCTION

GROUP 1: Shovel; crane; truck crane; cherry picker; derrick; pile driver; two or more drum machines; lighters; derrick boats; trenching machines; mechanic hoist pavement breakers; cement concrete pavers; draglines; hoisting engines; pumpcrete machines; elevating graders; shovel dozer; front end loader; backhoe; gradall; cable ways; boring machine; rotary drill; post hole hammer; post hole digger; fork lift; timber jack; asphalt plant (on site); concrete batching and/or mixing plant (on site); crusher plant (on site); paving concrete mixer

GROUP 2: Portable steam boiler; portable steam generator; sonic or vibratory hammer; grader; scraper; tandem scraper; concrete pump; bulldozer; tractor; York rake; mulching machine; roller; spreader; tamper (self-propelled or tractor-drawn); asphalt paver; concrete mixer with side loader; mechanic - maintenance; cal tracks; ballast regulator; switch tamper; rail anchor machine; tire truck

GROUP 3: Pumps (1-3 grouped); compressor; welding machines (1-3 grouped); generator; lighting plant; heaters (power driven 1-5); syphon-pulsometer; concrete mixer; valves controlling permanent plant air or steam; conveyor; well point systems; auger (powered by independent engines and attached to pile drivers); hydraulic saws

GROUP 4: Fireman

GROUP 5: Assistant engineer (other than truck crane and gradall)

GROUP 6: Assistant engineer (on truck crane and gradall)

ENGI0098-005 12/01/2016

	Rates	Fringes
Power equipment operators:		
Group 1.....	\$ 33.68	23.96+A
Group 2.....	\$ 33.37	23.96+A
Group 3.....	\$ 33.15	23.96+A
Group 4.....	\$ 32.54	23.96+A
Group 5.....	\$ 29.92	23.96+A
Group 6.....	\$ 28.80	23.96+A
Group 7.....	\$ 26.86	23.96+A
Group 8.....	\$ 305.95	23.96+A
Group 9.....	\$ 230.69	23.96+A
Group 10.....	\$ 35.17	23.96+A
Group 11.....	\$ 38.18	23.96+A
Group 12.....	\$ 39.68	23.96+A
Group 13.....	\$ 40.68	23.96+A
Group 14.....	\$ 41.68	23.96+A
Group 15.....	\$ 43.18	23.96+A

HAZARDOUS WASTE PREMIUM \$2.00

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:

Group 8 and Group 9 are per day wages.

A. Paid Holidays: New year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

Group 1: Shovels; crawlers and truck cranes including all tower; self-propelled hydraulic cranes 10 tons and over; draglines; clam shells; cableways; shaft hoists; mucking

machines derricks; backhoes; bulldozers; gradalls; elevating graders; pile drivers; concrete pavers; trenching machines; front end loaders- 5 1/2 cu yds and over; dual drum paver; automatic grader-excavator(C.M.I. or equal); scrapers towing pan or wagon; tandem dozers or push cats(2 units in tandem); shotcrete machine; tunnel boring machine; combination backhoe/loader 3/4 cu yd hoe or over; jet engine dryer; tree shredder; post hole digger; post hole hammer; post extractor; truck mounted concrete pump with boom; roto-mill; Grader; Horizontal Drilling Machine; John Henry Rock Drill and similar equipment.

Group 2: Rotary drill with mounted compressor; compressor house (3 to 6 compressors); rock and earth boring machines (excluding McCarthy and similar drills); front end loaders 4 cu yds to 5 1/2 cu yds); forklifts-7 ft lift and over 3 ton capacity; scraper 21 yds and over (struck load); sonic hammer console; reclaimers road planer/milling machine; cal tracks; ballast regulators; rail anchor machines; switch tampers, asphalt pavers; mechanic; welder and transfer machine.

Group 3: Combination backhoe/loader up to 3/4 cu yd; scrapers up to 21 cu yd (struck load, self propelled or tractor drawn); tireman; front end loaders up to 4 yds; well drillers; engineer or fireman on high pressure boiler; self-loading batch plant; well point operators electric pumps used in well point system; pumps, 16 inches and over (total discharge); compressor, one or two 900 cu ft and over; powered grease truck; tunnel locomotives and dingys; grout pumps; hydraulic jacks; boom truck; hydraulic cranes-up to 10 ton.

Group 4: Asphalt rollers; self-powered rollers and compactors; tractor without blade drawing sheepsfoot roller; rubber tire roller; vibratory roller or other type of compactors including machines for pulverizing and aerating soil; york rake.

Group 5: Hoists; conveyors; power pavement breakers; self-powered concrete pavement finishing machines; two bag mixers with skip; McCarthy and similar drills; batch plants (not self loading); bulk cement plants; self-propelled material spreaders; three or more 10 KW light plants; 30 KW or more generators; power broom.

Group 6: Compressor (one or two) 315 cu ft to 900 cu ft; pumps 4 inches to 16 inches (total discharge).

Group 7: Compressors up to 315 cu ft; small mixers with skip; pumps up to 4 inches; power heaters; oiler; A-frame trucks; forklifts-up to 7 ft. lift and up to 3 ton capacity; hydro broom; stud welder.

Group 8: Truck crane crews

Group 9: Oiler

Group 10: Master Mechanic

Group 11: Boom lengths over 150 feet including jib

Group 12: Boom lengths over 200 feet including jib

Group 13: Boom lengths over 250 feet including jib

Group 14: Boom lengths over 300 feet including jib

Group 15: Boom lengths over 350 feet including jib

IRON0007-012 09/16/2017

	Rates	Fringes
IRONWORKER.....	\$ 44.41	30.56

LABO0022-001 06/01/2018

	Rates	Fringes
Laborers: (HEAVY CONSTRUCTION)		
GROUP 1.....	\$ 33.25	22.92
GROUP 2.....	\$ 33.50	22.92
GROUP 3.....	\$ 34.00	22.92
GROUP 4.....	\$ 34.25	22.92
GROUP 5.....	\$ 21.50	22.92
GROUP 6.....	\$ 34.25	22.92

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; carpenter tenders; cement finisher tenders, plasterer tenders

GROUP 2: Asphalt raker; fence and guard rail erector; laser beam operator; mason tender; pipelayer; pneumatic drill operator; pneumatic tool operator; wagon drill operator, jack hammer operator, pavement breaker, carbide core drilling machine, chain saw operator, barco type jumping tampers, concrete pump, motorized mortar mixer, ride-on-motorized buggy

GROUP 3: Air track operator; block paver; rammer; curb setter, hydraulic and similar self powered drills

GROUP 4: Blaster; powderman

GROUP 5: Flagger

GROUP 6: Asbestos Abatement; Toxic and Hazardous Waste Laborers

LAB00022-013 06/01/2018

	Rates	Fringes
Laborers:		
(FREE AIR OPERATION):		
SHIELD DRIVEN AND LINER		
PLATE IN FREE AIR)		
GROUP 1.....	\$ 39.40	21.80+a
GROUP 2.....	\$ 39.40	21.80+a
(OPEN AIR CASSONS,		
UNDERPINNING AND TEST		
BORING INDUSTRIES):		
TEST BORING & WELL DRILLING		
Driller.....	\$ 39.35	24.30+A
Laborer.....	\$ 37.95	24.30+A
(OPEN AIR CASSONS,		
UNDERPINNING AND TEST		
BORING INDUSTRIES):		
OPEN AIR CASSON,		
UNDERPINNING WORK & BORING		
CREW		
Bottom man.....	\$ 39.10	24.30+A
Laborers; Top man.....	\$ 37.95	24.30+A
(TUNNELS, CAISSON &		

CYLINDER WORK IN
COMPRESSED AIR)

GROUP 1.....	\$ 39.75	24.70+a
GROUP 2.....	\$ 42.30	24.70+a
GROUP 3.....	\$ 42.30	24.70+a
GROUP 4.....	\$ 42.30	24.70+a
GROUP 5.....	\$ 42.30	24.70+a
GROUP 6.....	\$ 44.30	24.70+a

CLEANING CONCRETE AND
CAULKING TUNNEL (Both New
& Existing)

GROUP 1.....	\$ 39.40	21.80+a
GROUP 2.....	\$ 39.40	21.80+a

ROCK SHAFT, CONCRETE
LINING OF SAME AND TUNNEL
IN FREE AIR

GROUP 1.....	\$ 36.85	21.80+a
GROUP 2.....	\$ 39.40	21.80+a
GROUP 3.....	\$ 39.40	21.80+a
GROUP 4.....	\$ 39.40	21.80+a
GROUP 5.....	\$ 41.40	21.80+a

LABORERS CLASSIFICATIONS for TUNNELS, CAISSON & CYLINDER WORK
IN COMPRESSED AIR

GROUP 1: Powder watchman; Top man on iron bolt; change house
attendant

GROUP 2: Brakeman; trackman; groutman; tunnel laborer;
outside lock tender; lock tender; guage tender

GROUP 3: Motorman, miner

GROUP 4: Blaster

GROUP 5: Mucking machine operator

GROUP 6: Hazardous Waste work within the "HOT" zone. (A
premium of two dollars \$2.00 per hour over the basic wage
rate.

LABORERS CLASSIFICATIONS for (FREE AIR OPERATION): SHIELD
DRIVEN AND LINER PLATE IN FREE AIR

GROUP 1: Miner; miner welder; conveyor operator; motorman;
mucking machine operator; nozzle man; grout man-; pumps,
shaft and tunnel steel and rodman; shield and erector arm
operators, mole nipper, outside motorman, burner, TBM
operator, safety miner; laborer topside; heading motormen;
erecting operators; top signal men

GROUP 2: Brakeman; trackman

LABORERS CLASSIFICATIONS FOR CLEANING CONCRETE AND CAULKING
TUNNEL (Both New & Existing)

GROUP 1: Concrete workers; strippers and form movers (wood &
steel), cement finisher

GROUP 2: Form erector (wood & steel and all accessories)

LABORERS CLASSIFICATIONS for ROCK SHAFT, CONCRETE LINING OF

SAME AND TUNNE IN FREE AIR

GROUP 1: Change house attendants

GROUP 2: Laborers, topside, bottom men (when heading is 50 ft. from shaft) and all other laborers

GROUP 3: Brakeman; trackman; tunnel laborers; shaft laborers

GROUP 4: Miner; cage tender; bellman

GROUP 5: Hazardous Waste work within the "HOT" zone. (A premium of two dollars \$2.00 per hour over the basic wage rate)

FOOTNOTE FOR LABORERS:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Patriot's Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, and Christmas Day

LAB01421-003 06/01/2018

	Rates	Fringes
Laborers:		
Group 1.....	\$ 38.15	24.10
Group 2.....	\$ 38.90	24.10
Group 3.....	\$ 39.15	24.10
Group 4.....	\$ 34.15	24.10
Group 5.....	\$ 37.25	24.10
Group 6.....	\$ 38.15	24.10

Group 1: Adzeman, Wrecking Laborer.

Group 2: Burners, Jackhammers.

Group 3: Small Backhoes, Loaders on tracks, Bobcat Type Loaders, Hydraulic "Brock" Type Hammer Operators, Concrete Cutting Saws.

Group 4: Yardman (Salvage Yard Only).

Group 5: Yardman, Burners, Sawyers.

Group 6: Asbestos, Lead Paint, Toxic and Hazardous Waste.

PAIN0035-006 01/01/2018

	Rates	Fringes
Painters:		
NEW CONSTRUCTION:		
Bridge.....	\$ 49.66	28.90
Brush, Taper.....	\$ 39.16	28.90
Spray, Sandblast.....	\$ 40.56	28.90
REPAINT		
Bridge.....	\$ 49.66	28.90
Brush, Taper.....	\$ 37.22	28.90
Spray, Sandblast.....	\$ 38.62	28.90

PAIN0035-021 01/01/2018

	Rates	Fringes
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GLAZIER.....	\$ 39.16	28.90
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PLUM0004-002 03/01/2018

WORCESTER (Except Hopedale and Southboro)

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 43.96	25.61

PLUM0012-002 03/01/2018

WORCESTER (Hopedale and Southboro)

	Rates	Fringes
PLUMBER.....	\$ 54.69	28.93

ROOF0033-001 02/01/2018

	Rates	Fringes
Roofers: All Tear-off and/or removal of any types of roofing and all spudding, sweeping, vacuuming and/or cleanup of any and all areas of any type where a roof is to be relaid.....	\$ 42.36	26.80

SFMA0669-002 04/01/2017

	Rates	Fringes
SPRINKLER FITTER.....	\$ 40.26	15.84

SHEE0017-004 10/01/2015

WORCESTER (Harvard, Lancaster)

	Rates	Fringes
Sheet metal worker.....	\$ 35.60	30.05

SHEE0063-002 01/01/2016

WORCESTER (Except Harvard & Lancaster)

	Rates	Fringes
Sheet metal worker.....	\$ 31.57	28.12

TEAM0379-003 12/01/2017

	Rates	Fringes
Truck drivers: Group 1.....	\$ 32.48	24.27+A+B
Group 2.....	\$ 32.65	24.27+A+B
Group 3.....	\$ 32.72	24.27+A+B
Group 4.....	\$ 32.84	24.27+A+B
Group 5.....	\$ 32.94	24.27+A+B
Group 6.....	\$ 33.23	24.27+A+B

Group 7.....\$ 33.52 24.27+A+B

TRUCK DRIVERS CLASSIFICATIONS

Group 1: Station wagons; panel trucks; and pickup trucks

Group 2: Two axle equipment; & forklift operator

Group 3: Three axle equipment and tireman

Group 4: Four and Five Axle equipment

Group 5: Specialized earth moving equipment under 35 tons
other than conventional type trucks; low bed; vachual;
mechanics, paving restoration equipment

Group 6: Specialized earth moving equipment over 35 tons

Group 7: Trailers for earth moving equipment (double hookup)

POWER TRUCKS \$.25 DIFFERENTIAL BY AXLE TUNNEL WORK
(UNDERGROUND ONLY) \$.40 DIFFERENTIAL BY AXLE HAZARDOUS
MATERIALS (In Hot Zone Only) \$2.00 premium

FOOTNOTES: A. PAID HOLIDAYS: New Year's Day, Washington's
Birthday, Memorial Day, Independence Day, Labor Day,
Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving
Day, & Christmas Day

B. PAID VACATION: Employees with 4 months to 1 year of
service receive 1/2 day's pay per month; 1 week vacation
for 1 - 5 years of service; 2 weeks vacation for 5 - 10
years of service; and 3 weeks vacation for more than 10
years of service

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
for Federal Contractors applies to all contracts subject to the
Davis-Bacon Act for which the contract is awarded (and any
solicitation was issued) on or after January 1, 2017. If this
contract is covered by the EO, the contractor must provide
employees with 1 hour of paid sick leave for every 30 hours
they work, up to 56 hours of paid sick leave each year.
Employees must be permitted to use paid sick leave for their
own illness, injury or other health-related needs, including
preventive care; to assist a family member (or person who is
like family to the employee) who is ill, injured, or has other
health-related needs, including preventive care; or for reasons
resulting from, or to assist a family member (or person who is
like family to the employee) who is a victim of, domestic
violence, sexual assault, or stalking. Additional information
on contractor requirements and worker protections under the EO
is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within
the scope of the classifications listed may be added after
award only as provided in the labor standards contract clauses
(29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION



CHARLES D. BAKER
Governor

KARYN E. POLITO
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

**As determined by the Director under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H**

ROSALIN ACOSTA
Secretary
WILLIAM D MCKINNEY
Director

Awarding Authority: City of Gardner
Contract Number: **City/Town:** GARDNER
Description of Work: Theatre Park & Parking Lot Project is not limited to, selective demolition, earthwork, parking lots, sidewalks, site lighting and other work, appurtenances & incidental items as set in the contract
Job Location: 115 Pleasant St

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.15	\$10.91	\$10.89	\$0.00	\$53.95
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.22	\$10.91	\$10.89	\$0.00	\$54.02
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.34	\$10.91	\$10.89	\$0.00	\$54.14
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2018	\$97.80	\$9.90	\$21.15	\$0.00	\$128.85
	08/01/2019	\$102.78	\$9.90	\$21.15	\$0.00	\$133.83
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2018	\$34.00	\$7.70	\$14.02	\$0.00	\$55.72
	12/01/2018	\$34.84	\$7.70	\$14.02	\$0.00	\$56.56
	06/01/2019	\$35.71	\$7.70	\$14.02	\$0.00	\$57.43
	12/01/2019	\$36.57	\$7.70	\$14.02	\$0.00	\$58.29
	06/01/2020	\$37.46	\$7.70	\$14.02	\$0.00	\$59.18
	12/01/2020	\$38.35	\$7.70	\$14.02	\$0.00	\$60.07
	06/01/2021	\$39.27	\$7.70	\$14.02	\$0.00	\$60.99
	12/01/2021	\$40.18	\$7.70	\$14.02	\$0.00	\$61.90
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS WORKER (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (WORCESTER)</i>	06/01/2018	\$36.90	\$11.50	\$7.10	\$0.00	\$55.50
	12/01/2018	\$37.90	\$11.50	\$7.10	\$0.00	\$56.50
	06/01/2019	\$38.90	\$11.50	\$7.10	\$0.00	\$57.50
	12/01/2019	\$39.90	\$11.50	\$7.10	\$0.00	\$58.50
	06/01/2020	\$40.90	\$11.50	\$7.10	\$0.00	\$59.50
	12/01/2020	\$41.90	\$11.50	\$7.10	\$0.00	\$60.50
ASPHALT RAKER <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$47.08	\$11.00	\$15.50	\$0.00	\$73.58
	12/01/2018	\$48.23	\$11.00	\$15.50	\$0.00	\$74.73
	06/01/2019	\$49.33	\$11.00	\$15.50	\$0.00	\$75.83
	12/01/2019	\$50.48	\$11.00	\$15.50	\$0.00	\$76.98
	06/01/2020	\$51.58	\$11.00	\$15.50	\$0.00	\$78.08
	12/01/2020	\$52.73	\$11.00	\$15.50	\$0.00	\$79.23
	06/01/2021	\$53.83	\$11.00	\$15.50	\$0.00	\$80.33
	12/01/2021	\$54.98	\$11.00	\$15.50	\$0.00	\$81.48
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$47.08	\$11.00	\$15.50	\$0.00	\$73.58
	12/01/2018	\$48.23	\$11.00	\$15.50	\$0.00	\$74.73
	06/01/2019	\$49.33	\$11.00	\$15.50	\$0.00	\$75.83
	12/01/2019	\$50.48	\$11.00	\$15.50	\$0.00	\$76.98
	06/01/2020	\$51.58	\$11.00	\$15.50	\$0.00	\$78.08
	12/01/2020	\$52.73	\$11.00	\$15.50	\$0.00	\$79.23
	06/01/2021	\$53.83	\$11.00	\$15.50	\$0.00	\$80.33
	12/01/2021	\$54.98	\$11.00	\$15.50	\$0.00	\$81.48
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 2</i>	06/01/2018	\$34.00	\$7.70	\$14.02	\$0.00	\$55.72
	12/01/2018	\$34.84	\$7.70	\$14.02	\$0.00	\$56.56
	06/01/2019	\$35.71	\$7.70	\$14.02	\$0.00	\$57.43
	12/01/2019	\$36.57	\$7.70	\$14.02	\$0.00	\$58.29
	06/01/2020	\$37.46	\$7.70	\$14.02	\$0.00	\$59.18
	12/01/2020	\$38.35	\$7.70	\$14.02	\$0.00	\$60.07
	06/01/2021	\$39.27	\$7.70	\$14.02	\$0.00	\$60.99
	12/01/2021	\$40.18	\$7.70	\$14.02	\$0.00	\$61.90
For apprentice rates see "Apprentice- LABORER"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	03/01/2018	\$43.57	\$7.07	\$17.46	\$0.00	\$68.10
	01/01/2019	\$44.71	\$7.07	\$17.72	\$0.00	\$69.50
	01/01/2020	\$46.10	\$7.07	\$17.98	\$0.00	\$71.15

Apprentice - BOILERMAKER - Local 29**Effective Date - 03/01/2018**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$28.32	\$7.07	\$11.37	\$0.00	\$46.76
2	65	\$28.32	\$7.07	\$11.37	\$0.00	\$46.76
3	70	\$30.50	\$7.07	\$12.23	\$0.00	\$49.80
4	75	\$32.68	\$7.07	\$13.11	\$0.00	\$52.86
5	80	\$34.86	\$7.07	\$13.97	\$0.00	\$55.90
6	85	\$37.03	\$7.07	\$14.86	\$0.00	\$58.96
7	90	\$39.21	\$7.07	\$15.72	\$0.00	\$62.00
8	95	\$41.39	\$7.07	\$16.61	\$0.00	\$65.07

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$29.06	\$7.07	\$11.52	\$0.00	\$47.65
2	65	\$29.06	\$7.07	\$11.52	\$0.00	\$47.65
3	70	\$31.30	\$7.07	\$12.40	\$0.00	\$50.77
4	75	\$33.53	\$7.07	\$13.30	\$0.00	\$53.90
5	80	\$35.77	\$7.07	\$14.18	\$0.00	\$57.02
6	85	\$38.00	\$7.07	\$15.07	\$0.00	\$60.14
7	90	\$40.24	\$7.07	\$15.95	\$0.00	\$63.26
8	95	\$42.47	\$7.07	\$16.84	\$0.00	\$66.38

Notes:**Apprentice to Journeyworker Ratio:1:4**

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	08/01/2018	\$50.81	\$10.75	\$20.06	\$0.00	\$81.62
BRICKLAYERS LOCAL 3 (LOWELL)	02/01/2019	\$51.41	\$10.75	\$20.06	\$0.00	\$82.22
	08/01/2019	\$52.76	\$10.75	\$20.20	\$0.00	\$83.71
	02/01/2020	\$53.36	\$10.75	\$20.20	\$0.00	\$84.31
	08/01/2020	\$54.71	\$10.75	\$20.35	\$0.00	\$85.81
	02/01/2021	\$55.31	\$10.75	\$20.35	\$0.00	\$86.41
	08/01/2021	\$56.71	\$10.75	\$20.51	\$0.00	\$87.97
	02/01/2022	\$57.29	\$10.75	\$20.51	\$0.00	\$88.55

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Lowell
Effective Date - 08/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.41	\$10.75	\$20.06	\$0.00	\$56.22
2	60	\$30.49	\$10.75	\$20.06	\$0.00	\$61.30
3	70	\$35.57	\$10.75	\$20.06	\$0.00	\$66.38
4	80	\$40.65	\$10.75	\$20.06	\$0.00	\$71.46
5	90	\$45.73	\$10.75	\$20.06	\$0.00	\$76.54

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.71	\$10.75	\$20.06	\$0.00	\$56.52
2	60	\$30.85	\$10.75	\$20.06	\$0.00	\$61.66
3	70	\$35.99	\$10.75	\$20.06	\$0.00	\$66.80
4	80	\$41.13	\$10.75	\$20.06	\$0.00	\$71.94
5	90	\$46.27	\$10.75	\$20.06	\$0.00	\$77.08

Notes:
Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
OPERATING ENGINEERS LOCAL 4	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

CAISSON & UNDERPINNING BOTTOM MAN	06/01/2018	\$39.10	\$7.70	\$15.40	\$0.00	\$62.20
LABORERS - FOUNDATION AND MARINE	12/01/2018	\$40.05	\$7.70	\$15.40	\$0.00	\$63.15
	06/01/2019	\$41.05	\$7.70	\$15.40	\$0.00	\$64.15
	12/01/2019	\$42.05	\$7.70	\$15.40	\$0.00	\$65.15
	06/01/2020	\$43.04	\$7.70	\$15.40	\$0.00	\$66.14
	12/01/2020	\$44.02	\$7.70	\$15.40	\$0.00	\$67.12
	06/01/2021	\$45.04	\$7.70	\$15.40	\$0.00	\$68.14
	12/01/2021	\$46.05	\$7.70	\$15.40	\$0.00	\$69.15

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CAISSON & UNDERPINNING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2018	\$37.95	\$7.70	\$15.40	\$0.00	\$61.05
	12/01/2018	\$38.90	\$7.70	\$15.40	\$0.00	\$62.00
	06/01/2019	\$39.90	\$7.70	\$15.40	\$0.00	\$63.00
	12/01/2019	\$40.90	\$7.70	\$15.40	\$0.00	\$64.00
	06/01/2020	\$41.89	\$7.70	\$15.40	\$0.00	\$64.99
	12/01/2020	\$42.87	\$7.70	\$15.40	\$0.00	\$65.97
	06/01/2021	\$43.89	\$7.70	\$15.40	\$0.00	\$66.99
	12/01/2021	\$44.90	\$7.70	\$15.40	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2018	\$37.95	\$7.70	\$15.40	\$0.00	\$61.05
	12/01/2018	\$38.90	\$7.70	\$15.40	\$0.00	\$62.00
	06/01/2019	\$39.90	\$7.70	\$15.40	\$0.00	\$63.00
	12/01/2019	\$40.90	\$7.70	\$15.40	\$0.00	\$64.00
	06/01/2020	\$41.89	\$7.70	\$15.40	\$0.00	\$64.99
	12/01/2020	\$42.87	\$7.70	\$15.40	\$0.00	\$65.97
	06/01/2021	\$43.89	\$7.70	\$15.40	\$0.00	\$66.99
	12/01/2021	\$44.90	\$7.70	\$15.40	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
CARPENTER <i>CARPENTERS -ZONE 2 (Eastern Massachusetts)</i>	03/01/2018	\$40.28	\$9.90	\$17.50	\$0.00	\$67.68
	09/01/2018	\$41.32	\$9.90	\$17.50	\$0.00	\$68.72
	03/01/2019	\$42.35	\$9.90	\$17.50	\$0.00	\$69.75

Classification
Effective Date
Base Wage
Health
Pension
**Supplemental
Unemployment**
Total Rate
Apprentice - CARPENTER - Zone 2 Eastern MA
Effective Date - 03/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.14	\$9.90	\$1.73	\$0.00	\$31.77
2	60	\$24.17	\$9.90	\$1.73	\$0.00	\$35.80
3	70	\$28.20	\$9.90	\$12.31	\$0.00	\$50.41
4	75	\$30.21	\$9.90	\$12.31	\$0.00	\$52.42
5	80	\$32.22	\$9.90	\$14.04	\$0.00	\$56.16
6	80	\$32.22	\$9.90	\$14.04	\$0.00	\$56.16
7	90	\$36.25	\$9.90	\$15.77	\$0.00	\$61.92
8	90	\$36.25	\$9.90	\$15.77	\$0.00	\$61.92

Effective Date - 09/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.66	\$9.90	\$1.73	\$0.00	\$32.29
2	60	\$24.79	\$9.90	\$1.73	\$0.00	\$36.42
3	70	\$28.92	\$9.90	\$12.31	\$0.00	\$51.13
4	75	\$30.99	\$9.90	\$12.31	\$0.00	\$53.20
5	80	\$33.06	\$9.90	\$14.04	\$0.00	\$57.00
6	80	\$33.06	\$9.90	\$14.04	\$0.00	\$57.00
7	90	\$37.19	\$9.90	\$15.77	\$0.00	\$62.86
8	90	\$37.19	\$9.90	\$15.77	\$0.00	\$62.86

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 \$29.76/ 3&4 \$35.45/ 5&6 \$52.14/ 7&8 \$57.89

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME	04/01/2018	\$26.67	\$7.07	\$7.86	\$0.00	\$41.60
CARPENTERS -ZONE 2 (Wood Frame)	10/01/2018	\$27.09	\$7.07	\$7.86	\$0.00	\$42.02
	04/01/2019	\$27.52	\$7.07	\$7.86	\$0.00	\$42.45
	10/01/2019	\$27.95	\$7.07	\$7.86	\$0.00	\$42.88

As of 9/1/09 Carpentry work on wood-frame WEATHERIZATION projects shall be paid the WOOD FRAME CARPENTER rate.

Apprentice - CARPENTER (Wood Frame) - Zone 2**Effective Date -** 04/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$16.00	\$7.07	\$0.00	\$0.00	\$23.07
2	60	\$16.00	\$7.07	\$0.00	\$0.00	\$23.07
3	65	\$17.34	\$7.07	\$7.86	\$0.00	\$32.27
4	70	\$18.67	\$7.07	\$7.86	\$0.00	\$33.60
5	75	\$20.00	\$7.07	\$7.86	\$0.00	\$34.93
6	80	\$21.34	\$7.07	\$7.86	\$0.00	\$36.27
7	85	\$22.67	\$7.07	\$7.86	\$0.00	\$37.60
8	90	\$24.00	\$7.07	\$7.86	\$0.00	\$38.93

Effective Date - 10/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$16.25	\$7.07	\$0.00	\$0.00	\$23.32
2	60	\$16.25	\$7.07	\$0.00	\$0.00	\$23.32
3	65	\$17.61	\$7.07	\$7.86	\$0.00	\$32.54
4	70	\$18.96	\$7.07	\$7.86	\$0.00	\$33.89
5	75	\$20.32	\$7.07	\$7.86	\$0.00	\$35.25
6	80	\$21.67	\$7.07	\$7.86	\$0.00	\$36.60
7	85	\$23.03	\$7.07	\$7.86	\$0.00	\$37.96
8	90	\$24.38	\$7.07	\$7.86	\$0.00	\$39.31

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
 Step 1&2 \$19.07/ 3&4 \$26.49/ 5&6 \$33.60/ 7&8 \$36.27

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME (All Other Work)	06/01/2016	\$25.32	\$9.80	\$16.82	\$0.00	\$51.94
<i>CARPENTERS -ZONE 2 (Wood Frame)</i>						

CEMENT MASONRY/PLASTERING	07/01/2018	\$42.52	\$12.42	\$22.41	\$0.30	\$77.65
<i>BRICKLAYERS LOCAL 3 (LOWELL)</i>						
	01/01/2019	\$43.76	\$12.42	\$22.41	\$0.30	\$78.89
	07/01/2019	\$44.64	\$12.42	\$22.41	\$0.30	\$79.77
	01/01/2020	\$45.88	\$12.42	\$22.41	\$0.30	\$81.01

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - CEMENT MASONRY/PLASTERING - Lowell
Effective Date - 07/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.26	\$12.42	\$15.41	\$0.00	\$49.09
2	60	\$25.51	\$12.42	\$17.41	\$0.30	\$55.64
3	65	\$27.64	\$12.42	\$18.41	\$0.30	\$58.77
4	70	\$29.76	\$12.42	\$19.41	\$0.30	\$61.89
5	75	\$31.89	\$12.42	\$20.41	\$0.30	\$65.02
6	80	\$34.02	\$12.42	\$21.41	\$0.30	\$68.15
7	90	\$38.27	\$12.42	\$22.41	\$0.30	\$73.40

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.88	\$12.42	\$15.41	\$0.00	\$49.71
2	60	\$26.26	\$12.42	\$17.41	\$0.30	\$56.39
3	65	\$28.44	\$12.42	\$18.41	\$0.30	\$59.57
4	70	\$30.63	\$12.42	\$19.41	\$0.30	\$62.76
5	75	\$32.82	\$12.42	\$20.41	\$0.30	\$65.95
6	80	\$35.01	\$12.42	\$21.41	\$0.30	\$69.14
7	90	\$39.38	\$12.42	\$22.41	\$0.30	\$74.51

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
LABORERS - ZONE 2	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES	12/01/2017	\$47.63	\$10.50	\$15.50	\$0.00	\$73.63
OPERATING ENGINEERS LOCAL 4						
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR	06/01/2018	\$31.90	\$11.00	\$15.50	\$0.00	\$58.40
OPERATING ENGINEERS LOCAL 4	12/01/2018	\$32.68	\$11.00	\$15.50	\$0.00	\$59.18
	06/01/2019	\$33.43	\$11.00	\$15.50	\$0.00	\$59.93
	12/01/2019	\$34.22	\$11.00	\$15.50	\$0.00	\$60.72
	06/01/2020	\$34.97	\$11.00	\$15.50	\$0.00	\$61.47
	12/01/2020	\$35.75	\$11.00	\$15.50	\$0.00	\$62.25
	06/01/2021	\$36.50	\$11.00	\$15.50	\$0.00	\$63.00
	12/01/2021	\$37.29	\$11.00	\$15.50	\$0.00	\$63.79

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE)	07/01/2018	\$50.01	\$8.15	\$20.15	\$0.00	\$78.31
PAINTERS LOCAL 35 - ZONE 2	01/01/2019	\$50.36	\$8.15	\$20.85	\$0.00	\$79.36
	07/01/2019	\$51.46	\$8.15	\$20.85	\$0.00	\$80.46
	01/01/2020	\$52.56	\$8.15	\$20.85	\$0.00	\$81.56
	07/01/2020	\$53.66	\$8.15	\$20.85	\$0.00	\$82.66
	01/01/2021	\$54.76	\$8.15	\$20.85	\$0.00	\$83.76

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 07/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.01	\$8.15	\$0.00	\$0.00	\$33.16
2	55	\$27.51	\$8.15	\$5.34	\$0.00	\$41.00
3	60	\$30.01	\$8.15	\$5.82	\$0.00	\$43.98
4	65	\$32.51	\$8.15	\$6.31	\$0.00	\$46.97
5	70	\$35.01	\$8.15	\$17.24	\$0.00	\$60.40
6	75	\$37.51	\$8.15	\$17.73	\$0.00	\$63.39
7	80	\$40.01	\$8.15	\$18.21	\$0.00	\$66.37
8	90	\$45.01	\$8.15	\$19.18	\$0.00	\$72.34

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.18	\$8.15	\$0.00	\$0.00	\$33.33
2	55	\$27.70	\$8.15	\$5.64	\$0.00	\$41.49
3	60	\$30.22	\$8.15	\$6.15	\$0.00	\$44.52
4	65	\$32.73	\$8.15	\$6.66	\$0.00	\$47.54
5	70	\$35.25	\$8.15	\$17.78	\$0.00	\$61.18
6	75	\$37.77	\$8.15	\$18.29	\$0.00	\$64.21
7	80	\$40.29	\$8.15	\$18.80	\$0.00	\$67.24
8	90	\$45.32	\$8.15	\$19.83	\$0.00	\$73.30

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN	06/01/2018	\$38.15	\$7.70	\$15.20	\$0.00	\$61.05
LABORERS - ZONE 2	12/01/2018	\$39.10	\$7.70	\$15.20	\$0.00	\$62.00
	06/01/2019	\$40.10	\$7.70	\$15.20	\$0.00	\$63.00
	12/01/2019	\$41.10	\$7.70	\$15.20	\$0.00	\$64.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR	06/01/2018	\$39.15	\$7.70	\$15.20	\$0.00	\$62.05
LABORERS - ZONE 2	12/01/2018	\$40.10	\$7.70	\$15.20	\$0.00	\$63.00
	06/01/2019	\$41.10	\$7.70	\$15.20	\$0.00	\$64.00
	12/01/2019	\$42.10	\$7.70	\$15.20	\$0.00	\$65.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: BURNERS <i>LABORERS - ZONE 2</i>	06/01/2018	\$38.90	\$7.70	\$15.20	\$0.00	\$61.80
	12/01/2018	\$39.85	\$7.70	\$15.20	\$0.00	\$62.75
	06/01/2019	\$40.85	\$7.70	\$15.20	\$0.00	\$63.75
	12/01/2019	\$41.85	\$7.70	\$15.20	\$0.00	\$64.75
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER <i>LABORERS - ZONE 2</i>	06/01/2018	\$39.15	\$7.70	\$15.20	\$0.00	\$62.05
	12/01/2018	\$40.10	\$7.70	\$15.20	\$0.00	\$63.00
	06/01/2019	\$41.10	\$7.70	\$15.20	\$0.00	\$64.00
	12/01/2019	\$42.10	\$7.70	\$15.20	\$0.00	\$65.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2018	\$38.90	\$7.70	\$15.20	\$0.00	\$61.80
	12/01/2018	\$39.85	\$7.70	\$15.20	\$0.00	\$62.75
	06/01/2019	\$40.85	\$7.70	\$15.20	\$0.00	\$63.75
	12/01/2019	\$41.85	\$7.70	\$15.20	\$0.00	\$64.75
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER <i>LABORERS - ZONE 2</i>	06/01/2018	\$38.15	\$7.70	\$15.20	\$0.00	\$61.05
	12/01/2018	\$39.10	\$7.70	\$15.20	\$0.00	\$62.00
	06/01/2019	\$40.10	\$7.70	\$15.20	\$0.00	\$63.00
	12/01/2019	\$41.10	\$7.70	\$15.20	\$0.00	\$64.00
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2018	\$65.20	\$9.90	\$21.15	\$0.00	\$96.25
	08/01/2019	\$68.52	\$9.90	\$21.15	\$0.00	\$99.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2018	\$46.57	\$9.90	\$21.15	\$0.00	\$77.62
	08/01/2019	\$48.94	\$9.90	\$21.15	\$0.00	\$79.99
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2018	\$69.86	\$9.90	\$21.15	\$0.00	\$100.91
	08/01/2019	\$73.41	\$9.90	\$21.15	\$0.00	\$104.46
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 2)</i>	08/01/2018	\$97.80	\$9.90	\$21.15	\$0.00	\$128.85
	08/01/2019	\$102.78	\$9.90	\$21.15	\$0.00	\$133.83
For apprentice rates see "Apprentice- PILE DRIVER"						
ELECTRICIAN <i>ELECTRICIANS LOCAL 96</i>	06/01/2018	\$42.32	\$9.92	\$15.80	\$0.00	\$68.04
	12/01/2018	\$42.57	\$10.17	\$15.83	\$0.00	\$68.57
	06/01/2019	\$44.57	\$10.17	\$16.11	\$0.00	\$70.85

Apprentice - *ELECTRICIAN - Local 96***Effective Date -** 06/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$16.93	\$9.92	\$0.51	\$0.00	\$27.36
2	43	\$18.20	\$9.92	\$0.55	\$0.00	\$28.67
3	48	\$20.31	\$9.92	\$12.71	\$0.00	\$42.94
4	55	\$23.28	\$9.92	\$13.13	\$0.00	\$46.33
5	65	\$27.51	\$9.92	\$13.73	\$0.00	\$51.16
6	80	\$33.86	\$9.92	\$14.61	\$0.00	\$58.39

Effective Date - 12/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.03	\$10.17	\$0.51	\$0.00	\$27.71
2	43	\$18.31	\$10.17	\$0.55	\$0.00	\$29.03
3	48	\$20.43	\$10.17	\$12.73	\$0.00	\$43.33
4	55	\$23.41	\$10.17	\$13.14	\$0.00	\$46.72
5	65	\$27.67	\$10.17	\$13.74	\$0.00	\$51.58
6	80	\$34.06	\$10.17	\$14.63	\$0.00	\$58.86

Notes:

Steps 1-2 are 1000 hrs; Steps 3-6 are 1500 hrs.

Apprentice to Journeyworker Ratio:2:3***ELEVATOR CONSTRUCTOR
ELEVATOR CONSTRUCTORS LOCAL 41

01/01/2018	\$51.46	\$15.43	\$16.61	\$0.00	\$83.50
01/01/2019	\$53.11	\$15.58	\$17.51	\$0.00	\$86.20
01/01/2020	\$54.85	\$15.73	\$18.41	\$0.00	\$88.99
01/01/2021	\$56.69	\$15.88	\$19.31	\$0.00	\$91.88
01/01/2022	\$58.62	\$16.03	\$20.21	\$0.00	\$94.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
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Apprentice - ELEVATOR CONSTRUCTOR - Local 41

Effective Date - 01/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.73	\$15.43	\$0.00	\$0.00	\$41.16
2	55	\$28.30	\$15.43	\$16.61	\$0.00	\$60.34
3	65	\$33.45	\$15.43	\$16.61	\$0.00	\$65.49
4	70	\$36.02	\$15.43	\$16.61	\$0.00	\$68.06
5	80	\$41.17	\$15.43	\$16.61	\$0.00	\$73.21

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.56	\$15.58	\$0.00	\$0.00	\$42.14
2	55	\$29.21	\$15.58	\$17.51	\$0.00	\$62.30
3	65	\$34.52	\$15.58	\$17.51	\$0.00	\$67.61
4	70	\$37.18	\$15.58	\$17.51	\$0.00	\$70.27
5	80	\$42.49	\$15.58	\$17.51	\$0.00	\$75.58

Notes:

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER	01/01/2018	\$36.02	\$15.43	\$16.61	\$0.00	\$68.06
ELEVATOR CONSTRUCTORS LOCAL 41	01/01/2019	\$37.18	\$15.58	\$17.51	\$0.00	\$70.27
	01/01/2020	\$38.40	\$15.73	\$18.41	\$0.00	\$72.54
	01/01/2021	\$39.68	\$15.88	\$19.31	\$0.00	\$74.87
	01/01/2022	\$41.03	\$16.03	\$20.21	\$0.00	\$77.27
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
LABORERS - ZONE 2	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY	05/01/2018	\$42.84	\$10.50	\$15.50	\$0.00	\$68.84
OPERATING ENGINEERS LOCAL 4	For apprentice rates see "Apprentice- OPERATING ENGINEERS"					
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY	05/01/2018	\$44.31	\$10.50	\$15.50	\$0.00	\$70.31
OPERATING ENGINEERS LOCAL 4	For apprentice rates see "Apprentice- OPERATING ENGINEERS"					
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY	05/01/2018	\$22.51	\$10.50	\$15.50	\$0.00	\$48.51
OPERATING ENGINEERS LOCAL 4	For apprentice rates see "Apprentice- OPERATING ENGINEERS"					

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 96</i>	06/01/2018	\$42.32	\$9.92	\$15.80	\$0.00	\$68.04
	12/01/2018	\$42.57	\$10.17	\$15.83	\$0.00	\$68.57
	06/01/2019	\$44.57	\$10.17	\$16.11	\$0.00	\$70.85
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINT/COMMISSIONING <i>ELECTRICIANS LOCAL 96</i>	06/01/2018	\$42.32	\$9.92	\$15.80	\$0.00	\$68.04
	12/01/2018	\$42.57	\$10.17	\$15.83	\$0.00	\$68.57
	06/01/2019	\$44.57	\$10.17	\$16.11	\$0.00	\$70.85
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$38.83	\$11.00	\$15.50	\$0.00	\$65.33
	12/01/2018	\$39.78	\$11.00	\$15.50	\$0.00	\$66.28
	06/01/2019	\$40.69	\$11.00	\$15.50	\$0.00	\$67.19
	12/01/2019	\$41.64	\$11.00	\$15.50	\$0.00	\$68.14
	06/01/2020	\$42.55	\$11.00	\$15.50	\$0.00	\$69.05
	12/01/2020	\$43.50	\$11.00	\$15.50	\$0.00	\$70.00
	06/01/2021	\$44.41	\$11.00	\$15.50	\$0.00	\$70.91
	12/01/2021	\$45.36	\$11.00	\$15.50	\$0.00	\$71.86
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER <i>LABORERS - ZONE 2</i>	06/01/2018	\$21.50	\$7.70	\$14.02	\$0.00	\$43.22
	12/01/2018	\$22.50	\$7.70	\$14.02	\$0.00	\$44.22
	06/01/2019	\$22.50	\$7.70	\$14.02	\$0.00	\$44.22
	12/01/2019	\$23.50	\$7.70	\$14.02	\$0.00	\$45.22
	06/01/2020	\$23.50	\$7.70	\$14.02	\$0.00	\$45.22
	12/01/2020	\$24.50	\$7.70	\$14.02	\$0.00	\$46.22
	06/01/2021	\$24.50	\$7.70	\$14.02	\$0.00	\$46.22
	12/01/2021	\$24.50	\$7.70	\$14.02	\$0.00	\$46.22
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE II</i>	03/01/2016	\$39.82	\$9.80	\$17.62	\$0.00	\$67.24

Apprentice - FLOORCOVERER - Local 2168 Zone II

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.91	\$9.80	\$1.79	\$0.00	\$31.50
2	55	\$21.90	\$9.80	\$1.79	\$0.00	\$33.49
3	60	\$23.89	\$9.80	\$12.25	\$0.00	\$45.94
4	65	\$25.88	\$9.80	\$12.25	\$0.00	\$47.93
5	70	\$27.87	\$9.80	\$14.04	\$0.00	\$51.71
6	75	\$29.87	\$9.80	\$14.04	\$0.00	\$53.71
7	80	\$31.86	\$9.80	\$15.83	\$0.00	\$57.49
8	85	\$33.85	\$9.80	\$15.83	\$0.00	\$59.48

Notes: Steps are 750 hrs.
 % After 09/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
 Step 1&2 \$29.51/ 3&4 \$35.22/ 5&6 \$51.71/ 7&8 \$57.49

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FORK LIFT/CHERRY PICKER <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$47.08	\$11.00	\$15.50	\$0.00	\$73.58
	12/01/2018	\$48.23	\$11.00	\$15.50	\$0.00	\$74.73
	06/01/2019	\$49.33	\$11.00	\$15.50	\$0.00	\$75.83
	12/01/2019	\$50.48	\$11.00	\$15.50	\$0.00	\$76.98
	06/01/2020	\$51.58	\$11.00	\$15.50	\$0.00	\$78.08
	12/01/2020	\$52.73	\$11.00	\$15.50	\$0.00	\$79.23
	06/01/2021	\$53.83	\$11.00	\$15.50	\$0.00	\$80.33
	12/01/2021	\$54.98	\$11.00	\$15.50	\$0.00	\$81.48
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$31.90	\$11.00	\$15.50	\$0.00	\$58.40
	12/01/2018	\$32.68	\$11.00	\$15.50	\$0.00	\$59.18
	06/01/2019	\$33.43	\$11.00	\$15.50	\$0.00	\$59.93
	12/01/2019	\$34.22	\$11.00	\$15.50	\$0.00	\$60.72
	06/01/2020	\$34.97	\$11.00	\$15.50	\$0.00	\$61.47
	12/01/2020	\$35.75	\$11.00	\$15.50	\$0.00	\$62.25
	06/01/2021	\$36.50	\$11.00	\$15.50	\$0.00	\$63.00
	12/01/2021	\$37.29	\$11.00	\$15.50	\$0.00	\$63.79
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) <i>GLAZIERS LOCAL 35 (ZONE 2)</i>	07/01/2018	\$39.51	\$8.15	\$20.15	\$0.00	\$67.81
	01/01/2019	\$39.86	\$8.15	\$20.85	\$0.00	\$68.86
	07/01/2019	\$40.96	\$8.15	\$20.85	\$0.00	\$69.96
	01/01/2020	\$42.06	\$8.15	\$20.85	\$0.00	\$71.06
	07/01/2020	\$43.16	\$8.15	\$20.85	\$0.00	\$72.16
	01/01/2021	\$44.26	\$8.15	\$20.85	\$0.00	\$73.26

Classification

Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate

Apprentice - GLAZIER - Local 35 Zone 2
Effective Date - 07/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.76	\$8.15	\$0.00	\$0.00	\$27.91
2	55	\$21.73	\$8.15	\$5.34	\$0.00	\$35.22
3	60	\$23.71	\$8.15	\$5.82	\$0.00	\$37.68
4	65	\$25.68	\$8.15	\$6.31	\$0.00	\$40.14
5	70	\$27.66	\$8.15	\$17.24	\$0.00	\$53.05
6	75	\$29.63	\$8.15	\$17.73	\$0.00	\$55.51
7	80	\$31.61	\$8.15	\$18.21	\$0.00	\$57.97
8	90	\$35.56	\$8.15	\$19.18	\$0.00	\$62.89

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.93	\$8.15	\$0.00	\$0.00	\$28.08
2	55	\$21.92	\$8.15	\$5.64	\$0.00	\$35.71
3	60	\$23.92	\$8.15	\$6.15	\$0.00	\$38.22
4	65	\$25.91	\$8.15	\$6.66	\$0.00	\$40.72
5	70	\$27.90	\$8.15	\$17.78	\$0.00	\$53.83
6	75	\$29.90	\$8.15	\$18.29	\$0.00	\$56.34
7	80	\$31.89	\$8.15	\$18.80	\$0.00	\$58.84
8	90	\$35.87	\$8.15	\$19.83	\$0.00	\$63.85

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1
HOISTING ENGINEER/CRANES/GRADALLS
OPERATING ENGINEERS LOCAL 4

06/01/2018	\$47.08	\$11.00	\$15.50	\$0.00	\$73.58
12/01/2018	\$48.23	\$11.00	\$15.50	\$0.00	\$74.73
06/01/2019	\$49.33	\$11.00	\$15.50	\$0.00	\$75.83
12/01/2019	\$50.48	\$11.00	\$15.50	\$0.00	\$76.98
06/01/2020	\$51.58	\$11.00	\$15.50	\$0.00	\$78.08
12/01/2020	\$52.73	\$11.00	\$15.50	\$0.00	\$79.23
06/01/2021	\$53.83	\$11.00	\$15.50	\$0.00	\$80.33
12/01/2021	\$54.98	\$11.00	\$15.50	\$0.00	\$81.48

Classification
Effective Date
Base Wage
Health
Pension
**Supplemental
Unemployment**
Total Rate
Apprentice - OPERATING ENGINEERS - Local 4
Effective Date - 06/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$25.89	\$11.00	\$0.00	\$0.00	\$36.89
2	60	\$28.25	\$11.00	\$15.50	\$0.00	\$54.75
3	65	\$30.60	\$11.00	\$15.50	\$0.00	\$57.10
4	70	\$32.96	\$11.00	\$15.50	\$0.00	\$59.46
5	75	\$35.31	\$11.00	\$15.50	\$0.00	\$61.81
6	80	\$37.66	\$11.00	\$15.50	\$0.00	\$64.16
7	85	\$40.02	\$11.00	\$15.50	\$0.00	\$66.52
8	90	\$42.37	\$11.00	\$15.50	\$0.00	\$68.87

Effective Date - 12/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$26.53	\$11.00	\$0.00	\$0.00	\$37.53
2	60	\$28.94	\$11.00	\$15.50	\$0.00	\$55.44
3	65	\$31.35	\$11.00	\$15.50	\$0.00	\$57.85
4	70	\$33.76	\$11.00	\$15.50	\$0.00	\$60.26
5	75	\$36.17	\$11.00	\$15.50	\$0.00	\$62.67
6	80	\$38.58	\$11.00	\$15.50	\$0.00	\$65.08
7	85	\$41.00	\$11.00	\$15.50	\$0.00	\$67.50
8	90	\$43.41	\$11.00	\$15.50	\$0.00	\$69.91

Notes:
Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 63	07/01/2018	\$33.74	\$10.64	\$16.22	\$1.77	\$62.37
	01/01/2019	\$34.74	\$10.64	\$16.22	\$1.77	\$63.37
	07/01/2019	\$35.74	\$10.64	\$16.22	\$1.77	\$64.37
	01/01/2020	\$36.99	\$10.64	\$16.22	\$1.77	\$65.62
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 96	06/01/2018	\$42.32	\$9.92	\$15.80	\$0.00	\$68.04
	12/01/2018	\$42.57	\$10.17	\$15.83	\$0.00	\$68.57
	06/01/2019	\$44.57	\$10.17	\$16.11	\$0.00	\$70.85
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 63	07/01/2018	\$33.74	\$10.64	\$16.22	\$1.77	\$62.37
	01/01/2019	\$34.74	\$10.64	\$16.22	\$1.77	\$63.37
	07/01/2019	\$35.74	\$10.64	\$16.22	\$1.77	\$64.37
	01/01/2020	\$36.99	\$10.64	\$16.22	\$1.77	\$65.62
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) PLUMBERS LOCAL 4	03/01/2018	\$43.96	\$9.35	\$14.91	\$0.00	\$68.22
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC PLUMBERS LOCAL 4	03/01/2018	\$43.96	\$9.35	\$14.91	\$0.00	\$68.22

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS <i>LABORERS - ZONE 2</i>	06/01/2018	\$34.00	\$7.70	\$14.02	\$0.00	\$55.72
	12/01/2018	\$34.84	\$7.70	\$14.02	\$0.00	\$56.56
	06/01/2019	\$35.71	\$7.70	\$14.02	\$0.00	\$57.43
	12/01/2019	\$36.57	\$7.70	\$14.02	\$0.00	\$58.29
	06/01/2020	\$37.46	\$7.70	\$14.02	\$0.00	\$59.18
	12/01/2020	\$38.35	\$7.70	\$14.02	\$0.00	\$60.07
	06/01/2021	\$39.27	\$7.70	\$14.02	\$0.00	\$60.99
	12/01/2021	\$40.18	\$7.70	\$14.02	\$0.00	\$61.90
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (WORCESTER)</i>	09/01/2017	\$42.38	\$11.75	\$14.20	\$0.00	\$68.33
	09/01/2018	\$44.40	\$11.75	\$14.20	\$0.00	\$70.35
	09/01/2019	\$46.65	\$11.75	\$14.20	\$0.00	\$72.60
Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Worcester						
Effective Date - 09/01/2017						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.19	\$11.75	\$10.45	\$0.00	\$43.39
2	60	\$25.43	\$11.75	\$11.20	\$0.00	\$48.38
3	70	\$29.67	\$11.75	\$11.95	\$0.00	\$53.37
4	80	\$33.90	\$11.75	\$12.70	\$0.00	\$58.35
Effective Date - 09/01/2018						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.20	\$11.75	\$10.45	\$0.00	\$44.40
2	60	\$26.64	\$11.75	\$11.20	\$0.00	\$49.59
3	70	\$31.08	\$11.75	\$11.95	\$0.00	\$54.78
4	80	\$35.52	\$11.75	\$12.70	\$0.00	\$59.97
Notes:						
Steps are 1 year						
Apprentice to Journeyworker Ratio:1:4						
IRONWORKER/WELDER <i>IRONWORKERS LOCAL 7 (WORCESTER AREA)</i>	03/16/2017	\$44.35	\$7.80	\$20.85	\$0.00	\$73.00

Classification

**Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate**

Apprentice - IRONWORKER - Local 7 Worcester

Effective Date - 03/16/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.61	\$7.80	\$20.85	\$0.00	\$55.26
2	70	\$31.05	\$7.80	\$20.85	\$0.00	\$59.70
3	75	\$33.26	\$7.80	\$20.85	\$0.00	\$61.91
4	80	\$35.48	\$7.80	\$20.85	\$0.00	\$64.13
5	85	\$37.70	\$7.80	\$20.85	\$0.00	\$66.35
6	90	\$39.92	\$7.80	\$20.85	\$0.00	\$68.57

Notes:

Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:

JACKHAMMER & PAVING BREAKER OPERATOR	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
LABORERS - ZONE 2	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40

For apprentice rates see "Apprentice- LABORER"

LABORER	06/01/2018	\$33.25	\$7.70	\$14.02	\$0.00	\$54.97
LABORERS - ZONE 2	12/01/2018	\$34.09	\$7.70	\$14.02	\$0.00	\$55.81
	06/01/2019	\$34.96	\$7.70	\$14.02	\$0.00	\$56.68
	12/01/2019	\$35.82	\$7.70	\$14.02	\$0.00	\$57.54
	06/01/2020	\$36.71	\$7.70	\$14.02	\$0.00	\$58.43
	12/01/2020	\$37.60	\$7.70	\$14.02	\$0.00	\$59.32
	06/01/2021	\$38.52	\$7.70	\$14.02	\$0.00	\$60.24
	12/01/2021	\$39.43	\$7.70	\$14.02	\$0.00	\$61.15

Classification
Effective Date
Base Wage
Health
Pension
**Supplemental
Unemployment**
Total Rate
Apprentice - LABORER - Zone 2
Effective Date - 06/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$19.95	\$7.70	\$14.02	\$0.00	\$41.67
2	70	\$23.28	\$7.70	\$14.02	\$0.00	\$45.00
3	80	\$26.60	\$7.70	\$14.02	\$0.00	\$48.32
4	90	\$29.93	\$7.70	\$14.02	\$0.00	\$51.65

Effective Date - 12/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$20.45	\$7.70	\$14.02	\$0.00	\$42.17
2	70	\$23.86	\$7.70	\$14.02	\$0.00	\$45.58
3	80	\$27.27	\$7.70	\$14.02	\$0.00	\$48.99
4	90	\$30.68	\$7.70	\$14.02	\$0.00	\$52.40

Notes:
Apprentice to Journeyworker Ratio:1:5
LABORER: CARPENTER TENDER
LABORERS - ZONE 2

06/01/2018	\$33.25	\$7.70	\$14.02	\$0.00	\$54.97
12/01/2018	\$34.09	\$7.70	\$14.02	\$0.00	\$55.81
06/01/2019	\$34.96	\$7.70	\$14.02	\$0.00	\$56.68
12/01/2019	\$35.82	\$7.70	\$14.02	\$0.00	\$57.54
06/01/2020	\$36.71	\$7.70	\$14.02	\$0.00	\$58.43
12/01/2020	\$37.60	\$7.70	\$14.02	\$0.00	\$59.32
06/01/2021	\$38.52	\$7.70	\$14.02	\$0.00	\$60.24
12/01/2021	\$39.43	\$7.70	\$14.02	\$0.00	\$61.15

For apprentice rates see "Apprentice- LABORER"

LABORER: CEMENT FINISHER TENDER
LABORERS - ZONE 2

06/01/2018	\$33.25	\$7.70	\$14.02	\$0.00	\$54.97
12/01/2018	\$34.09	\$7.70	\$14.02	\$0.00	\$55.81
06/01/2019	\$34.96	\$7.70	\$14.02	\$0.00	\$56.68
12/01/2019	\$35.82	\$7.70	\$14.02	\$0.00	\$57.54
06/01/2020	\$36.71	\$7.70	\$14.02	\$0.00	\$58.43
12/01/2020	\$37.60	\$7.70	\$14.02	\$0.00	\$59.32
06/01/2021	\$38.52	\$7.70	\$14.02	\$0.00	\$60.24
12/01/2021	\$39.43	\$7.70	\$14.02	\$0.00	\$61.15

For apprentice rates see "Apprentice- LABORER"

LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER
LABORERS - ZONE 2

06/01/2018	\$33.45	\$7.70	\$13.97	\$0.00	\$55.12
12/01/2018	\$34.29	\$7.70	\$13.97	\$0.00	\$55.96
06/01/2019	\$35.16	\$7.70	\$13.97	\$0.00	\$56.83
12/01/2019	\$36.02	\$7.70	\$13.97	\$0.00	\$57.69

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: MASON TENDER <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.25	\$7.70	\$14.02	\$0.00	\$54.97
	12/01/2018	\$34.09	\$7.70	\$14.02	\$0.00	\$55.81
	06/01/2019	\$34.96	\$7.70	\$14.02	\$0.00	\$56.68
	12/01/2019	\$35.82	\$7.70	\$14.02	\$0.00	\$57.54
	06/01/2020	\$36.71	\$7.70	\$14.02	\$0.00	\$58.43
	12/01/2020	\$37.60	\$7.70	\$14.02	\$0.00	\$59.32
	06/01/2021	\$38.52	\$7.70	\$14.02	\$0.00	\$60.24
	12/01/2021	\$39.43	\$7.70	\$14.02	\$0.00	\$61.15
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.25	\$7.70	\$14.02	\$0.00	\$54.97
	12/01/2018	\$34.09	\$7.70	\$14.02	\$0.00	\$55.81
	06/01/2019	\$34.96	\$7.70	\$14.02	\$0.00	\$56.68
	12/01/2019	\$35.82	\$7.70	\$14.02	\$0.00	\$57.54
	06/01/2020	\$36.71	\$7.70	\$14.02	\$0.00	\$58.43
	12/01/2020	\$37.60	\$7.70	\$14.02	\$0.00	\$59.32
	06/01/2021	\$38.52	\$7.70	\$14.02	\$0.00	\$60.24
	12/01/2021	\$39.43	\$7.70	\$14.02	\$0.00	\$61.15
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i>	08/01/2018	\$40.40	\$10.75	\$18.97	\$0.00	\$70.12
	02/01/2019	\$40.91	\$10.75	\$18.97	\$0.00	\$70.63
	08/01/2019	\$41.99	\$10.75	\$19.11	\$0.00	\$71.85
	02/01/2020	\$42.50	\$10.75	\$19.11	\$0.00	\$72.36
	08/01/2020	\$43.58	\$10.75	\$19.26	\$0.00	\$73.59
	02/01/2021	\$44.09	\$10.75	\$19.26	\$0.00	\$74.10
	08/01/2021	\$45.21	\$10.75	\$19.42	\$0.00	\$75.38
	02/01/2022	\$45.68	\$10.75	\$19.42	\$0.00	\$75.85

Classification

**Effective Date Base Wage Health Pension Supplemental
Unemployment Total Rate**

Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile

Effective Date - 08/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.20	\$10.75	\$18.97	\$0.00	\$49.92
2	60	\$24.24	\$10.75	\$18.97	\$0.00	\$53.96
3	70	\$28.28	\$10.75	\$18.97	\$0.00	\$58.00
4	80	\$32.32	\$10.75	\$18.97	\$0.00	\$62.04
5	90	\$36.36	\$10.75	\$18.97	\$0.00	\$66.08

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.46	\$10.75	\$18.97	\$0.00	\$50.18
2	60	\$24.55	\$10.75	\$18.97	\$0.00	\$54.27
3	70	\$28.64	\$10.75	\$18.97	\$0.00	\$58.36
4	80	\$32.73	\$10.75	\$18.97	\$0.00	\$62.45
5	90	\$36.82	\$10.75	\$18.97	\$0.00	\$66.54

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH	08/01/2018	\$52.95	\$10.75	\$20.66	\$0.00	\$84.36
BRICKLAYERS LOCAL 3 - MARBLE & TILE	02/01/2019	\$53.57	\$10.75	\$20.66	\$0.00	\$84.98
	08/01/2019	\$54.92	\$10.75	\$20.80	\$0.00	\$86.47
	02/01/2020	\$55.55	\$10.75	\$20.80	\$0.00	\$87.10
	08/01/2020	\$56.90	\$10.75	\$20.95	\$0.00	\$88.60
	02/01/2021	\$57.54	\$10.75	\$20.95	\$0.00	\$89.24
	08/01/2021	\$58.94	\$10.75	\$21.11	\$0.00	\$90.80
	02/01/2022	\$59.51	\$10.75	\$21.11	\$0.00	\$91.37

Classification
Effective Date
Base Wage
Health
Pension
**Supplemental
Unemployment**
Total Rate
Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile
Effective Date - 08/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.48	\$10.75	\$20.66	\$0.00	\$57.89
2	60	\$31.77	\$10.75	\$20.66	\$0.00	\$63.18
3	70	\$37.07	\$10.75	\$20.66	\$0.00	\$68.48
4	80	\$42.36	\$10.75	\$20.66	\$0.00	\$73.77
5	90	\$47.66	\$10.75	\$20.66	\$0.00	\$79.07

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.79	\$10.75	\$20.66	\$0.00	\$58.20
2	60	\$32.14	\$10.75	\$20.66	\$0.00	\$63.55
3	70	\$37.50	\$10.75	\$20.66	\$0.00	\$68.91
4	80	\$42.86	\$10.75	\$20.66	\$0.00	\$74.27
5	90	\$48.21	\$10.75	\$20.66	\$0.00	\$79.62

Notes:
Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES)	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
OPERATING ENGINEERS LOCAL 4	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
OPERATING ENGINEERS LOCAL 4	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 3)	04/01/2018	\$35.46	\$9.90	\$18.50	\$0.00	\$63.86
MILLWRIGHTS LOCAL 1121 - Zone 3	10/01/2018	\$36.29	\$9.90	\$18.50	\$0.00	\$64.69
	04/01/2019	\$37.11	\$9.90	\$18.50	\$0.00	\$65.51

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - MILLWRIGHT - Local 1121 Zone 3						
Effective Date - 04/01/2018						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$19.50	\$9.90	\$5.31	\$0.00	\$34.71
2	65	\$23.05	\$9.90	\$15.13	\$0.00	\$48.08
3	75	\$26.60	\$9.90	\$16.10	\$0.00	\$52.60
4	85	\$30.14	\$9.90	\$17.06	\$0.00	\$57.10
<div>Notes:</div> <div>Steps are 2,000 hours</div> <div>Apprentice to Journeyworker Ratio:1:5</div>						
<hr/>						
MORTAR MIXER	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
LABORERS - ZONE 2	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
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OILER (OTHER THAN TRUCK CRANES,GRADALLS)	06/01/2018	\$23.14	\$11.00	\$15.50	\$0.00	\$49.64
OPERATING ENGINEERS LOCAL 4	12/01/2018	\$23.71	\$11.00	\$15.50	\$0.00	\$50.21
	06/01/2019	\$24.26	\$11.00	\$15.50	\$0.00	\$50.76
	12/01/2019	\$24.83	\$11.00	\$15.50	\$0.00	\$51.33
	06/01/2020	\$25.38	\$11.00	\$15.50	\$0.00	\$51.88
	12/01/2020	\$25.95	\$11.00	\$15.50	\$0.00	\$52.45
	06/01/2021	\$26.50	\$11.00	\$15.50	\$0.00	\$53.00
	12/01/2021	\$27.08	\$11.00	\$15.50	\$0.00	\$53.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
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OILER (TRUCK CRANES, GRADALLS)	06/01/2018	\$27.40	\$11.00	\$15.50	\$0.00	\$53.90
OPERATING ENGINEERS LOCAL 4	12/01/2018	\$28.07	\$11.00	\$15.50	\$0.00	\$54.57
	06/01/2019	\$28.72	\$11.00	\$15.50	\$0.00	\$55.22
	12/01/2019	\$29.39	\$11.00	\$15.50	\$0.00	\$55.89
	06/01/2020	\$30.04	\$11.00	\$15.50	\$0.00	\$56.54
	12/01/2020	\$30.72	\$11.00	\$15.50	\$0.00	\$57.22
	06/01/2021	\$31.36	\$11.00	\$15.50	\$0.00	\$57.86
	12/01/2021	\$32.04	\$11.00	\$15.50	\$0.00	\$58.54
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
OTHER POWER DRIVEN EQUIPMENT - CLASS II <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 2</i>	07/01/2018	\$50.01	\$8.15	\$20.15	\$0.00	\$78.31
	01/01/2019	\$50.36	\$8.15	\$20.85	\$0.00	\$79.36
	07/01/2019	\$51.46	\$8.15	\$20.85	\$0.00	\$80.46
	01/01/2020	\$52.56	\$8.15	\$20.85	\$0.00	\$81.56
	07/01/2020	\$53.66	\$8.15	\$20.85	\$0.00	\$82.66
	01/01/2021	\$54.76	\$8.15	\$20.85	\$0.00	\$83.76

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 07/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.01	\$8.15	\$0.00	\$0.00	\$33.16
2	55	\$27.51	\$8.15	\$5.34	\$0.00	\$41.00
3	60	\$30.01	\$8.15	\$5.82	\$0.00	\$43.98
4	65	\$32.51	\$8.15	\$6.31	\$0.00	\$46.97
5	70	\$35.01	\$8.15	\$17.24	\$0.00	\$60.40
6	75	\$37.51	\$8.15	\$17.73	\$0.00	\$63.39
7	80	\$40.01	\$8.15	\$18.21	\$0.00	\$66.37
8	90	\$45.01	\$8.15	\$19.18	\$0.00	\$72.34

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.18	\$8.15	\$0.00	\$0.00	\$33.33
2	55	\$27.70	\$8.15	\$5.64	\$0.00	\$41.49
3	60	\$30.22	\$8.15	\$6.15	\$0.00	\$44.52
4	65	\$32.73	\$8.15	\$6.66	\$0.00	\$47.54
5	70	\$35.25	\$8.15	\$17.78	\$0.00	\$61.18
6	75	\$37.77	\$8.15	\$18.29	\$0.00	\$64.21
7	80	\$40.29	\$8.15	\$18.80	\$0.00	\$67.24
8	90	\$45.32	\$8.15	\$19.83	\$0.00	\$73.30

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PAINTER (SPRAY OR SANDBLAST, NEW) *	07/01/2018	\$40.91	\$8.15	\$20.15	\$0.00	\$69.21
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2019	\$41.26	\$8.15	\$20.85	\$0.00	\$70.26
	07/01/2019	\$42.36	\$8.15	\$20.85	\$0.00	\$71.36
	01/01/2020	\$43.46	\$8.15	\$20.85	\$0.00	\$72.46
	07/01/2020	\$44.56	\$8.15	\$20.85	\$0.00	\$73.56
	01/01/2021	\$45.66	\$8.15	\$20.85	\$0.00	\$74.66

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New

Effective Date - 07/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.46	\$8.15	\$0.00	\$0.00	\$28.61
2	55	\$22.50	\$8.15	\$5.34	\$0.00	\$35.99
3	60	\$24.55	\$8.15	\$5.82	\$0.00	\$38.52
4	65	\$26.59	\$8.15	\$6.31	\$0.00	\$41.05
5	70	\$28.64	\$8.15	\$17.24	\$0.00	\$54.03
6	75	\$30.68	\$8.15	\$17.73	\$0.00	\$56.56
7	80	\$32.73	\$8.15	\$18.21	\$0.00	\$59.09
8	90	\$36.82	\$8.15	\$19.18	\$0.00	\$64.15

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.63	\$8.15	\$0.00	\$0.00	\$28.78
2	55	\$22.69	\$8.15	\$5.64	\$0.00	\$36.48
3	60	\$24.76	\$8.15	\$6.15	\$0.00	\$39.06
4	65	\$26.82	\$8.15	\$6.66	\$0.00	\$41.63
5	70	\$28.88	\$8.15	\$17.78	\$0.00	\$54.81
6	75	\$30.95	\$8.15	\$18.29	\$0.00	\$57.39
7	80	\$33.01	\$8.15	\$18.80	\$0.00	\$59.96
8	90	\$37.13	\$8.15	\$19.83	\$0.00	\$65.11

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT)	07/01/2018	\$38.97	\$8.15	\$20.15	\$0.00	\$67.27
<i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2019	\$39.32	\$8.15	\$20.85	\$0.00	\$68.32
	07/01/2019	\$40.42	\$8.15	\$20.85	\$0.00	\$69.42
	01/01/2020	\$41.52	\$8.15	\$20.85	\$0.00	\$70.52
	07/01/2020	\$42.62	\$8.15	\$20.85	\$0.00	\$71.62
	01/01/2021	\$43.72	\$8.15	\$20.85	\$0.00	\$72.72

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint
Effective Date - 07/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.49	\$8.15	\$0.00	\$0.00	\$27.64
2	55	\$21.43	\$8.15	\$5.34	\$0.00	\$34.92
3	60	\$23.38	\$8.15	\$5.82	\$0.00	\$37.35
4	65	\$25.33	\$8.15	\$6.31	\$0.00	\$39.79
5	70	\$27.28	\$8.15	\$17.24	\$0.00	\$52.67
6	75	\$29.23	\$8.15	\$17.73	\$0.00	\$55.11
7	80	\$31.18	\$8.15	\$18.21	\$0.00	\$57.54
8	90	\$35.07	\$8.15	\$19.18	\$0.00	\$62.40

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.66	\$8.15	\$0.00	\$0.00	\$27.81
2	55	\$21.63	\$8.15	\$5.64	\$0.00	\$35.42
3	60	\$23.59	\$8.15	\$6.15	\$0.00	\$37.89
4	65	\$25.56	\$8.15	\$6.66	\$0.00	\$40.37
5	70	\$27.52	\$8.15	\$17.78	\$0.00	\$53.45
6	75	\$29.49	\$8.15	\$18.29	\$0.00	\$55.93
7	80	\$31.46	\$8.15	\$18.80	\$0.00	\$58.41
8	90	\$35.39	\$8.15	\$19.83	\$0.00	\$63.37

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (TRAFFIC MARKINGS)	06/01/2018	\$33.25	\$7.70	\$14.02	\$0.00	\$54.97
LABORERS - ZONE 2	12/01/2018	\$34.09	\$7.70	\$14.02	\$0.00	\$55.81
	06/01/2019	\$34.96	\$7.70	\$14.02	\$0.00	\$56.68
	12/01/2019	\$35.82	\$7.70	\$14.02	\$0.00	\$57.54
	06/01/2020	\$36.71	\$7.70	\$14.02	\$0.00	\$58.43
	12/01/2020	\$37.60	\$7.70	\$14.02	\$0.00	\$59.32
	06/01/2021	\$38.52	\$7.70	\$14.02	\$0.00	\$60.24
	12/01/2021	\$39.43	\$7.70	\$14.02	\$0.00	\$61.15

For Apprentice rates see "Apprentice- LABORER"

PAINTER / TAPER (BRUSH, NEW) *	07/01/2018	\$39.51	\$8.15	\$20.15	\$0.00	\$67.81
* If 30% or more of surfaces to be painted are new construction,	01/01/2019	\$39.86	\$8.15	\$20.85	\$0.00	\$68.86
NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	07/01/2019	\$40.96	\$8.15	\$20.85	\$0.00	\$69.96
	01/01/2020	\$42.06	\$8.15	\$20.85	\$0.00	\$71.06
	07/01/2020	\$43.16	\$8.15	\$20.85	\$0.00	\$72.16
	01/01/2021	\$44.25	\$8.15	\$20.85	\$0.00	\$73.25

Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW**Effective Date - 07/01/2018**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.76	\$8.15	\$0.00	\$0.00	\$27.91
2	55	\$21.73	\$8.15	\$5.34	\$0.00	\$35.22
3	60	\$23.71	\$8.15	\$5.82	\$0.00	\$37.68
4	65	\$25.68	\$8.15	\$6.31	\$0.00	\$40.14
5	70	\$27.66	\$8.15	\$17.24	\$0.00	\$53.05
6	75	\$29.63	\$8.15	\$17.73	\$0.00	\$55.51
7	80	\$31.61	\$8.15	\$18.21	\$0.00	\$57.97
8	90	\$35.56	\$8.15	\$19.18	\$0.00	\$62.89

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.93	\$8.15	\$0.00	\$0.00	\$28.08
2	55	\$21.92	\$8.15	\$5.64	\$0.00	\$35.71
3	60	\$23.92	\$8.15	\$6.15	\$0.00	\$38.22
4	65	\$25.91	\$8.15	\$6.66	\$0.00	\$40.72
5	70	\$27.90	\$8.15	\$17.78	\$0.00	\$53.83
6	75	\$29.90	\$8.15	\$18.29	\$0.00	\$56.34
7	80	\$31.89	\$8.15	\$18.80	\$0.00	\$58.84
8	90	\$35.87	\$8.15	\$19.83	\$0.00	\$63.85

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT)

PAINTERS LOCAL 35 - ZONE 2

07/01/2018	\$37.57	\$8.15	\$20.15	\$0.00	\$65.87
01/01/2019	\$37.92	\$8.15	\$20.85	\$0.00	\$66.92
07/01/2019	\$39.02	\$8.15	\$20.85	\$0.00	\$68.02
01/01/2020	\$40.12	\$8.15	\$20.85	\$0.00	\$69.12
07/01/2020	\$41.22	\$8.15	\$20.85	\$0.00	\$70.22
01/01/2021	\$42.32	\$8.15	\$20.85	\$0.00	\$71.32

Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT**Effective Date - 07/01/2018**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.79	\$8.15	\$0.00	\$0.00	\$26.94
2	55	\$20.66	\$8.15	\$5.34	\$0.00	\$34.15
3	60	\$22.54	\$8.15	\$5.82	\$0.00	\$36.51
4	65	\$24.42	\$8.15	\$6.31	\$0.00	\$38.88
5	70	\$26.30	\$8.15	\$17.24	\$0.00	\$51.69
6	75	\$28.18	\$8.15	\$17.73	\$0.00	\$54.06
7	80	\$30.06	\$8.15	\$18.21	\$0.00	\$56.42
8	90	\$33.81	\$8.15	\$19.18	\$0.00	\$61.14

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.96	\$8.15	\$0.00	\$0.00	\$27.11
2	55	\$20.86	\$8.15	\$5.64	\$0.00	\$34.65
3	60	\$22.75	\$8.15	\$6.15	\$0.00	\$37.05
4	65	\$24.65	\$8.15	\$6.66	\$0.00	\$39.46
5	70	\$26.54	\$8.15	\$17.78	\$0.00	\$52.47
6	75	\$28.44	\$8.15	\$18.29	\$0.00	\$54.88
7	80	\$30.34	\$8.15	\$18.80	\$0.00	\$57.29
8	90	\$34.13	\$8.15	\$19.83	\$0.00	\$62.11

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PANEL & PICKUP TRUCKS DRIVER TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/01/2012	\$30.28	\$9.07	\$8.00	\$0.00	\$47.35
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PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2018	\$42.93	\$9.90	\$21.15	\$0.00	\$73.98
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PILE DRIVER LOCAL 56 (ZONE 2)	08/01/2019	\$44.61	\$9.90	\$21.15	\$0.00	\$75.66
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For apprentice rates see "Apprentice- PILE DRIVER"

PILE DRIVER	08/01/2018	\$42.93	\$9.90	\$21.15	\$0.00	\$73.98
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PILE DRIVER LOCAL 56 (ZONE 2)	08/01/2019	\$44.61	\$9.90	\$21.15	\$0.00	\$75.66
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Apprentice - PILE DRIVER - Local 56 Zone 2**Effective Date - 08/01/2018**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Notes: Apprentice wages shall be no less than the following Steps;

(Same as set in Zone 1)

1\$54.34/2\$58.99/3\$63.65/4\$65.98/5\$68.31/6\$68.31/7\$72.96/8\$72.96

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIPELAYER <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40

For apprentice rates see "Apprentice- LABORER"

PLUMBER & PIPEFITTER <i>PLUMBERS LOCAL 4</i>	03/01/2018	\$43.96	\$9.35	\$14.91	\$0.00	\$68.22
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Apprentice - PLUMBER/PIPEFITTER - Local 4

Effective Date - 03/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.58	\$9.35	\$0.00	\$0.00	\$26.93
2	50	\$21.98	\$9.35	\$0.00	\$0.00	\$31.33
3	60	\$26.38	\$9.35	\$0.00	\$0.00	\$35.73
4	70	\$30.77	\$9.35	\$5.20	\$0.00	\$45.32
5	80	\$35.17	\$9.35	\$5.20	\$0.00	\$49.72

Notes:

Steps - 2000 hrs; Step 4 w/lic 75%, Step 5 w/lic 85%
Step 4 w/lic \$47.52, Step 5 w/lic \$51.92

Apprentice to Journeyworker Ratio:1:3

PNEUMATIC CONTROLS (TEMP.) <i>PLUMBERS LOCAL 4</i>	03/01/2018	\$43.96	\$9.35	\$14.91	\$0.00	\$68.22
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For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

PNEUMATIC DRILL/TOOL OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40

For apprentice rates see "Apprentice- LABORER"

POWDERMAN & BLASTER <i>LABORERS - ZONE 2</i>	06/01/2018	\$34.25	\$7.70	\$14.02	\$0.00	\$55.97
	12/01/2018	\$35.09	\$7.70	\$14.02	\$0.00	\$56.81
	06/01/2019	\$35.96	\$7.70	\$14.02	\$0.00	\$57.68
	12/01/2019	\$36.82	\$7.70	\$14.02	\$0.00	\$58.54
	06/01/2020	\$37.71	\$7.70	\$14.02	\$0.00	\$59.43
	12/01/2020	\$38.60	\$7.70	\$14.02	\$0.00	\$60.32
	06/01/2021	\$39.52	\$7.70	\$14.02	\$0.00	\$61.24
	12/01/2021	\$40.43	\$7.70	\$14.02	\$0.00	\$62.15

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$47.08	\$11.00	\$15.50	\$0.00	\$73.58
	12/01/2018	\$48.23	\$11.00	\$15.50	\$0.00	\$74.73
	06/01/2019	\$49.33	\$11.00	\$15.50	\$0.00	\$75.83
	12/01/2019	\$50.48	\$11.00	\$15.50	\$0.00	\$76.98
	06/01/2020	\$51.58	\$11.00	\$15.50	\$0.00	\$78.08
	12/01/2020	\$52.73	\$11.00	\$15.50	\$0.00	\$79.23
	06/01/2021	\$53.83	\$11.00	\$15.50	\$0.00	\$80.33
	12/01/2021	\$54.98	\$11.00	\$15.50	\$0.00	\$81.48
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$47.08	\$11.00	\$15.50	\$0.00	\$73.58
	12/01/2018	\$48.23	\$11.00	\$15.50	\$0.00	\$74.73
	06/01/2019	\$49.33	\$11.00	\$15.50	\$0.00	\$75.83
	12/01/2019	\$50.48	\$11.00	\$15.50	\$0.00	\$76.98
	06/01/2020	\$51.58	\$11.00	\$15.50	\$0.00	\$78.08
	12/01/2020	\$52.73	\$11.00	\$15.50	\$0.00	\$79.23
	06/01/2021	\$53.83	\$11.00	\$15.50	\$0.00	\$80.33
	12/01/2021	\$54.98	\$11.00	\$15.50	\$0.00	\$81.48
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$31.90	\$11.00	\$15.50	\$0.00	\$58.40
	12/01/2018	\$32.68	\$11.00	\$15.50	\$0.00	\$59.18
	06/01/2019	\$33.43	\$11.00	\$15.50	\$0.00	\$59.93
	12/01/2019	\$34.22	\$11.00	\$15.50	\$0.00	\$60.72
	06/01/2020	\$34.97	\$11.00	\$15.50	\$0.00	\$61.47
	12/01/2020	\$35.75	\$11.00	\$15.50	\$0.00	\$62.25
	06/01/2021	\$36.50	\$11.00	\$15.50	\$0.00	\$63.00
	12/01/2021	\$37.29	\$11.00	\$15.50	\$0.00	\$63.79
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER <i>TEAMSTERS LOCAL 170</i>	05/01/2018	\$25.09	\$10.24	\$8.56	\$0.00	\$43.89
	12/01/2018	\$25.12	\$10.24	\$8.56	\$0.00	\$43.92
	01/01/2019	\$25.12	\$10.41	\$8.56	\$0.00	\$44.09
	12/01/2019	\$25.15	\$10.41	\$8.56	\$0.00	\$44.12
	01/01/2020	\$25.15	\$10.46	\$8.56	\$0.00	\$44.17
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
	12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
	06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
	12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
	06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
	12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
	06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
	12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofers Waterproofing &Roofers Dampproofg) <i>ROOFERS LOCAL 33</i>	08/01/2018	\$42.36	\$11.35	\$15.90	\$0.00	\$69.61
	02/01/2019	\$43.51	\$11.35	\$15.90	\$0.00	\$70.76

Apprentice - ROOFER - Local 33

Effective Date - 08/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.18	\$11.35	\$3.69	\$0.00	\$36.22
2	60	\$25.42	\$11.35	\$15.90	\$0.00	\$52.67
3	65	\$27.53	\$11.35	\$15.90	\$0.00	\$54.78
4	75	\$31.77	\$11.35	\$15.90	\$0.00	\$59.02
5	85	\$36.01	\$11.35	\$15.90	\$0.00	\$63.26

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.76	\$11.35	\$3.69	\$0.00	\$36.80
2	60	\$26.11	\$11.35	\$15.90	\$0.00	\$53.36
3	65	\$28.28	\$11.35	\$15.90	\$0.00	\$55.53
4	75	\$32.63	\$11.35	\$15.90	\$0.00	\$59.88
5	85	\$36.98	\$11.35	\$15.90	\$0.00	\$64.23

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.
(Hot Pitch Mechanics' receive \$1.00 hr. above ROOFER)

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE <i>ROOFERS LOCAL 33</i>	08/01/2018	\$42.61	\$11.35	\$15.90	\$0.00	\$69.86
	02/01/2019	\$43.76	\$11.35	\$15.90	\$0.00	\$71.01

For apprentice rates see "Apprentice- ROOFER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SHEETMETAL WORKER	07/01/2018	\$33.74	\$10.64	\$16.22	\$1.77	\$62.37
<i>SHEETMETAL WORKERS LOCAL 63</i>	01/01/2019	\$34.74	\$10.64	\$16.22	\$1.77	\$63.37
	07/01/2019	\$35.74	\$10.64	\$16.22	\$1.77	\$64.37
	01/01/2020	\$36.99	\$10.64	\$16.22	\$1.77	\$65.62

Apprentice - SHEET METAL WORKER - Local 63

Effective Date - 07/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$15.18	\$6.21	\$4.67	\$0.00	\$26.06
2	50	\$16.87	\$6.55	\$5.19	\$0.00	\$28.61
3	55	\$18.56	\$6.88	\$9.33	\$1.04	\$35.81
4	60	\$20.24	\$7.22	\$9.33	\$1.10	\$37.89
5	65	\$21.93	\$7.55	\$9.33	\$1.16	\$39.97
6	70	\$23.62	\$7.88	\$9.33	\$1.22	\$42.05
7	75	\$25.31	\$8.22	\$9.33	\$1.29	\$44.15
8	80	\$26.99	\$9.30	\$15.18	\$1.54	\$53.01
9	85	\$28.68	\$9.64	\$15.18	\$1.61	\$55.11
10	90	\$30.37	\$9.98	\$15.18	\$1.67	\$57.20

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$15.63	\$6.21	\$4.67	\$0.00	\$26.51
2	50	\$17.37	\$6.55	\$5.19	\$0.00	\$29.11
3	55	\$19.11	\$6.88	\$9.33	\$1.06	\$36.38
4	60	\$20.84	\$7.22	\$9.33	\$1.12	\$38.51
5	65	\$22.58	\$7.55	\$9.33	\$1.18	\$40.64
6	70	\$24.32	\$7.88	\$9.33	\$1.25	\$42.78
7	75	\$26.06	\$8.22	\$9.33	\$1.31	\$44.92
8	80	\$27.79	\$9.30	\$15.18	\$1.57	\$53.84
9	85	\$29.53	\$9.64	\$15.18	\$1.63	\$55.98
10	90	\$31.27	\$9.98	\$15.18	\$1.69	\$58.12

Notes:

Apprentice to Journeyworker Ratio:1:3

SIGN ERECTOR	06/01/2013	\$25.81	\$7.07	\$7.05	\$0.00	\$39.93
<i>PAINTERS LOCAL 35 - ZONE 2</i>						

Apprentice - SIGN ERECTOR - Local 35 Zone 2**Effective Date -** 06/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$12.91	\$7.07	\$0.00	\$0.00	\$19.98
2	55	\$14.20	\$7.07	\$2.45	\$0.00	\$23.72
3	60	\$15.49	\$7.07	\$2.45	\$0.00	\$25.01
4	65	\$16.78	\$7.07	\$2.45	\$0.00	\$26.30
5	70	\$18.07	\$7.07	\$7.05	\$0.00	\$32.19
6	75	\$19.36	\$7.07	\$7.05	\$0.00	\$33.48
7	80	\$20.65	\$7.07	\$7.05	\$0.00	\$34.77
8	85	\$21.94	\$7.07	\$7.05	\$0.00	\$36.06
9	90	\$23.23	\$7.07	\$7.05	\$0.00	\$37.35

Notes:

Steps are 4 mos.

Apprentice to Journeyworker Ratio:1:1

SPECIALIZED EARTH MOVING EQUIP < 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/01/2016	\$32.44	\$10.91	\$10.89	\$0.00	\$54.24
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SPECIALIZED EARTH MOVING EQUIP > 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/01/2016	\$32.73	\$10.91	\$10.89	\$0.00	\$54.53
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SPRINKLER FITTER SPRINKLER FITTERS LOCAL 669	04/01/2018	\$41.51	\$9.67	\$12.88	\$0.00	\$64.06
	01/01/2019	\$41.51	\$10.02	\$13.08	\$0.00	\$64.61

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - SPRINKLER FITTER - Local 669
Effective Date - 04/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$18.68	\$7.75	\$0.00	\$0.00	\$26.43
2	50	\$20.76	\$7.75	\$0.00	\$0.00	\$28.51
3	55	\$22.83	\$9.67	\$7.05	\$0.00	\$39.55
4	60	\$24.91	\$9.67	\$7.05	\$0.00	\$41.63
5	65	\$26.98	\$9.67	\$7.30	\$0.00	\$43.95
6	70	\$29.06	\$9.67	\$7.30	\$0.00	\$46.03
7	75	\$31.13	\$9.67	\$7.30	\$0.00	\$48.10
8	80	\$33.21	\$9.67	\$7.30	\$0.00	\$50.18
9	85	\$35.28	\$9.67	\$7.30	\$0.00	\$52.25
10	90	\$37.36	\$9.67	\$7.30	\$0.00	\$54.33

Effective Date - 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$18.68	\$7.75	\$0.00	\$0.00	\$26.43
2	50	\$20.76	\$7.75	\$0.00	\$0.00	\$28.51
3	55	\$22.83	\$10.02	\$7.25	\$0.00	\$40.10
4	60	\$24.91	\$10.02	\$7.25	\$0.00	\$42.18
5	65	\$26.98	\$10.02	\$7.50	\$0.00	\$44.50
6	70	\$29.06	\$10.02	\$7.50	\$0.00	\$46.58
7	75	\$31.13	\$10.02	\$7.50	\$0.00	\$48.65
8	80	\$33.21	\$10.02	\$7.50	\$0.00	\$50.73
9	85	\$35.28	\$10.02	\$7.50	\$0.00	\$52.80
10	90	\$37.36	\$10.02	\$7.50	\$0.00	\$54.88

Notes:
Apprentice to Journeyworker Ratio:1:1

STEAM BOILER OPERATOR	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
OPERATING ENGINEERS LOCAL 4	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TERRAZZO FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i>	08/01/2018	\$51.85	\$10.75	\$20.66	\$0.00	\$83.26
	02/01/2019	\$52.49	\$10.75	\$20.66	\$0.00	\$83.90
	08/01/2019	\$53.84	\$10.75	\$20.80	\$0.00	\$85.39
	02/01/2020	\$54.48	\$10.75	\$20.80	\$0.00	\$86.03
	08/01/2020	\$55.83	\$10.75	\$20.95	\$0.00	\$87.53
	02/01/2021	\$56.47	\$10.75	\$20.95	\$0.00	\$88.17
	08/01/2021	\$57.87	\$10.75	\$21.11	\$0.00	\$89.73
	02/01/2022	\$58.46	\$10.75	\$21.11	\$0.00	\$90.32

Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile

Effective Date - 08/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.93	\$10.75	\$20.03	\$0.00	\$56.71
2	60	\$31.11	\$10.75	\$20.03	\$0.00	\$61.89
3	70	\$36.30	\$10.75	\$20.03	\$0.00	\$67.08
4	80	\$41.48	\$10.75	\$20.03	\$0.00	\$72.26
5	90	\$46.67	\$10.75	\$20.03	\$0.00	\$77.45

Effective Date - 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.25	\$10.75	\$20.03	\$0.00	\$57.03
2	60	\$31.49	\$10.75	\$20.03	\$0.00	\$62.27
3	70	\$36.74	\$10.75	\$20.03	\$0.00	\$67.52
4	80	\$41.99	\$10.75	\$20.03	\$0.00	\$72.77
5	90	\$47.24	\$10.75	\$20.03	\$0.00	\$78.02

Notes:

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2018	\$39.35	\$7.70	\$15.40	\$0.00	\$62.45
	12/01/2018	\$40.30	\$7.70	\$15.40	\$0.00	\$63.40
	06/01/2019	\$41.30	\$7.70	\$15.40	\$0.00	\$64.40
	12/01/2019	\$42.30	\$7.70	\$15.40	\$0.00	\$65.40
	06/01/2020	\$43.29	\$7.70	\$15.40	\$0.00	\$66.39
	12/01/2020	\$44.27	\$7.70	\$15.40	\$0.00	\$67.37
	06/01/2021	\$45.29	\$7.70	\$15.40	\$0.00	\$68.39
	12/01/2021	\$46.30	\$7.70	\$15.40	\$0.00	\$69.40
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2018	\$38.07	\$7.70	\$15.40	\$0.00	\$61.17
	12/01/2018	\$39.02	\$7.70	\$15.40	\$0.00	\$62.12
	06/01/2019	\$40.02	\$7.70	\$15.40	\$0.00	\$63.12
	12/01/2019	\$41.02	\$7.70	\$15.40	\$0.00	\$64.12
	06/01/2020	\$42.01	\$7.70	\$15.40	\$0.00	\$65.11
	12/01/2020	\$42.99	\$7.70	\$15.40	\$0.00	\$66.09
	06/01/2021	\$44.01	\$7.70	\$15.40	\$0.00	\$67.11
	12/01/2021	\$45.02	\$7.70	\$15.40	\$0.00	\$68.12
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2018	\$37.95	\$7.70	\$15.40	\$0.00	\$61.05
	12/01/2018	\$38.90	\$7.70	\$15.40	\$0.00	\$62.00
	06/01/2019	\$39.90	\$7.70	\$15.40	\$0.00	\$63.00
	12/01/2019	\$40.90	\$7.70	\$15.40	\$0.00	\$64.00
	06/01/2020	\$41.89	\$7.70	\$15.40	\$0.00	\$64.99
	12/01/2020	\$42.87	\$7.70	\$15.40	\$0.00	\$65.97
	06/01/2021	\$43.89	\$7.70	\$15.40	\$0.00	\$66.99
	12/01/2021	\$44.90	\$7.70	\$15.40	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2018	\$46.61	\$11.00	\$15.50	\$0.00	\$73.11
	12/01/2018	\$47.75	\$11.00	\$15.50	\$0.00	\$74.25
	06/01/2019	\$48.84	\$11.00	\$15.50	\$0.00	\$75.34
	12/01/2019	\$49.98	\$11.00	\$15.50	\$0.00	\$76.48
	06/01/2020	\$51.06	\$11.00	\$15.50	\$0.00	\$77.56
	12/01/2020	\$52.20	\$11.00	\$15.50	\$0.00	\$78.70
	06/01/2021	\$53.29	\$11.00	\$15.50	\$0.00	\$79.79
	12/01/2021	\$54.43	\$11.00	\$15.50	\$0.00	\$80.93
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$33.02	\$10.91	\$10.89	\$0.00	\$54.82
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	06/01/2018	\$50.23	\$7.70	\$15.80	\$0.00	\$73.73
	12/01/2018	\$51.18	\$7.70	\$15.80	\$0.00	\$74.68
	06/01/2019	\$52.18	\$7.70	\$15.80	\$0.00	\$75.68
	12/01/2019	\$53.18	\$7.70	\$15.80	\$0.00	\$76.68
	06/01/2020	\$54.17	\$7.70	\$15.80	\$0.00	\$77.67
	12/01/2020	\$55.15	\$7.70	\$15.80	\$0.00	\$78.65
	06/01/2021	\$56.17	\$7.70	\$15.80	\$0.00	\$79.67
	12/01/2021	\$57.18	\$7.70	\$15.80	\$0.00	\$80.68
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	06/01/2018	\$52.23	\$7.70	\$15.80	\$0.00	\$75.73
	12/01/2018	\$53.18	\$7.70	\$15.80	\$0.00	\$76.68
	06/01/2019	\$54.18	\$7.70	\$15.80	\$0.00	\$77.68
	12/01/2019	\$55.18	\$7.70	\$15.80	\$0.00	\$78.68
	06/01/2020	\$56.17	\$7.70	\$15.80	\$0.00	\$79.67
	12/01/2020	\$57.15	\$7.70	\$15.80	\$0.00	\$80.65
	06/01/2021	\$58.17	\$7.70	\$15.80	\$0.00	\$81.67
	12/01/2021	\$59.18	\$7.70	\$15.80	\$0.00	\$82.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2018	\$42.30	\$7.70	\$15.80	\$0.00	\$65.80
	12/01/2018	\$43.25	\$7.70	\$15.80	\$0.00	\$66.75
	06/01/2019	\$44.25	\$7.70	\$15.80	\$0.00	\$67.75
	12/01/2019	\$45.25	\$7.70	\$15.80	\$0.00	\$68.75
	06/01/2020	\$46.24	\$7.70	\$15.80	\$0.00	\$69.74
	12/01/2020	\$47.22	\$7.70	\$15.80	\$0.00	\$70.72
	06/01/2021	\$48.24	\$7.70	\$15.80	\$0.00	\$71.74
	12/01/2021	\$49.25	\$7.70	\$15.80	\$0.00	\$72.75
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2018	\$44.30	\$7.70	\$15.80	\$0.00	\$67.80
	12/01/2018	\$45.25	\$7.70	\$15.80	\$0.00	\$68.75
	06/01/2019	\$46.25	\$7.70	\$15.80	\$0.00	\$69.75
	12/01/2019	\$47.25	\$7.70	\$15.80	\$0.00	\$70.75
	06/01/2020	\$48.24	\$7.70	\$15.80	\$0.00	\$71.74
	12/01/2020	\$49.22	\$7.70	\$15.80	\$0.00	\$72.72
	06/01/2021	\$50.24	\$7.70	\$15.80	\$0.00	\$73.74
	12/01/2021	\$51.25	\$7.70	\$15.80	\$0.00	\$74.75
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	12/01/2016	\$32.44	\$10.91	\$10.89	\$0.00	\$54.24
VOICE-DATA-VIDEO TECHNICIAN <i>ELECTRICIANS LOCAL 96</i>	06/01/2018	\$29.04	\$9.82	\$13.85	\$0.00	\$52.71
	12/01/2018	\$29.19	\$10.07	\$13.86	\$0.00	\$53.12
	06/01/2019	\$30.87	\$10.07	\$13.91	\$0.00	\$54.85

Classification
Effective Date
Base Wage
Health
Pension
**Supplemental
Unemployment**
Total Rate
Apprentice - VOICE-DATA-VIDEO TECHNICIAN - Local 96
Effective Date - 06/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$14.52	\$9.82	\$3.82	\$0.00	\$28.16
2	55	\$15.97	\$9.82	\$3.86	\$0.00	\$29.65
3	60	\$17.42	\$9.82	\$13.50	\$0.00	\$40.74
4	65	\$18.88	\$9.82	\$13.55	\$0.00	\$42.25
5	70	\$20.33	\$9.82	\$13.59	\$0.00	\$43.74
6	75	\$21.78	\$9.82	\$13.63	\$0.00	\$45.23
7	80	\$23.23	\$9.82	\$13.68	\$0.00	\$46.73
8	85	\$24.68	\$9.82	\$13.72	\$0.00	\$48.22

Effective Date - 12/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$14.60	\$10.07	\$3.82	\$0.00	\$28.49
2	55	\$16.05	\$10.07	\$3.86	\$0.00	\$29.98
3	60	\$17.51	\$10.07	\$13.51	\$0.00	\$41.09
4	65	\$18.97	\$10.07	\$13.55	\$0.00	\$42.59
5	70	\$20.43	\$10.07	\$13.59	\$0.00	\$44.09
6	75	\$21.89	\$10.07	\$13.64	\$0.00	\$45.60
7	80	\$23.35	\$10.07	\$13.68	\$0.00	\$47.10
8	85	\$24.81	\$10.07	\$13.72	\$0.00	\$48.60

Notes:
Apprentice to Journeyworker Ratio:1:1
WAGON DRILL OPERATOR
LABORERS - ZONE 2

06/01/2018	\$33.50	\$7.70	\$14.02	\$0.00	\$55.22
12/01/2018	\$34.34	\$7.70	\$14.02	\$0.00	\$56.06
06/01/2019	\$35.21	\$7.70	\$14.02	\$0.00	\$56.93
12/01/2019	\$36.07	\$7.70	\$14.02	\$0.00	\$57.79
06/01/2020	\$36.96	\$7.70	\$14.02	\$0.00	\$58.68
12/01/2020	\$37.85	\$7.70	\$14.02	\$0.00	\$59.57
06/01/2021	\$38.77	\$7.70	\$14.02	\$0.00	\$60.49
12/01/2021	\$39.68	\$7.70	\$14.02	\$0.00	\$61.40

For apprentice rates see "Apprentice- LABORER"

WASTE WATER PUMP OPERATOR
OPERATING ENGINEERS LOCAL 4

06/01/2018	\$47.08	\$11.00	\$15.50	\$0.00	\$73.58
12/01/2018	\$48.23	\$11.00	\$15.50	\$0.00	\$74.73
06/01/2019	\$49.33	\$11.00	\$15.50	\$0.00	\$75.83
12/01/2019	\$50.48	\$11.00	\$15.50	\$0.00	\$76.98
06/01/2020	\$51.58	\$11.00	\$15.50	\$0.00	\$78.08
12/01/2020	\$52.73	\$11.00	\$15.50	\$0.00	\$79.23
06/01/2021	\$53.83	\$11.00	\$15.50	\$0.00	\$80.33
12/01/2021	\$54.98	\$11.00	\$15.50	\$0.00	\$81.48

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WATER METER INSTALLER <i>PLUMBERS LOCAL 4</i>	03/01/2018	\$43.96	\$9.35	\$14.91	\$0.00	\$68.22
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$27.14	\$7.75	\$1.81	\$0.00	\$36.70
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$38.45	\$7.75	\$9.53	\$0.00	\$55.73
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$31.66	\$7.75	\$9.44	\$0.00	\$48.85
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$38.45	\$7.75	\$13.61	\$0.00	\$59.81
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$33.92	\$7.75	\$10.21	\$0.00	\$51.88
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$20.35	\$7.75	\$1.61	\$0.00	\$29.71
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$45.23	\$7.75	\$16.61	\$0.00	\$69.59

Apprentice - LINEMAN (Outside Electrical) - East Local 104

Effective Date - 09/03/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$27.14	\$7.75	\$3.31	\$0.00	\$38.20
2	65	\$29.40	\$7.75	\$3.38	\$0.00	\$40.53
3	70	\$31.66	\$7.75	\$3.45	\$0.00	\$42.86
4	75	\$33.92	\$7.75	\$5.02	\$0.00	\$46.69
5	80	\$36.18	\$7.75	\$5.09	\$0.00	\$49.02
6	85	\$38.45	\$7.75	\$5.15	\$0.00	\$51.35
7	90	\$40.71	\$7.75	\$7.22	\$0.00	\$55.68

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/05/2018	\$29.98	\$4.70	\$3.15	\$0.00	\$37.83
	02/04/2019	\$30.73	\$4.70	\$3.17	\$0.00	\$38.60

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TELEDATA LINEMAN/EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	05/05/2018	\$28.22	\$4.70	\$3.10	\$0.00	\$36.02
	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/05/2018	\$28.22	\$4.70	\$3.10	\$0.00	\$36.02
	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77
TREE TRIMMER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/31/2016	\$18.51	\$3.55	\$0.00	\$0.00	\$22.06
<p>This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground.</p> <p>This classification does not apply to wholesale tree removal.</p>						
TREE TRIMMER GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/31/2016	\$16.32	\$3.55	\$0.00	\$0.00	\$19.87
<p>This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.</p>						

Additional Apprentices Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.

*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Work of the Contract is shown and described in Drawings and Project Manual entitled:

Theater Park and Parking Lot Redevelopment Project
City of Gardner, Massachusetts
May, 2018

Tighe & Bond, Inc.
Consulting Engineers
Westfield, Massachusetts

2. The Work includes the following major items:
 - a. New asphalt parking areas
 - b. Pedestrian walkways, ramps, and stairs
 - c. Site lighting
 - d. New storm sewers, manholes, catch basins, and related work.
 - e. Site appurtenances
 - f. Landscaping

1.2 SUBMITTALS

A. Informational Submittals

1. Submit copies of permits or approvals required for the Work, prior to initiating the Work.

1.3 PROJECT/SITE CONDITIONS

A. Permits

1. Obtain the permits and approvals listed below:
 - a. Permits and licenses of a temporary nature necessary to perform the Work.
 - b. Permits for disposal of construction wastes including disposal of cleared and grubbed materials.
 - c. Other permits or licenses required for the Contractor's operations or required elsewhere in the Contract Documents and not included herein.

2. Obtain required time extensions to permits obtained by the Contractor, if construction authorized by permits has not been completed by the expiration date noted on these permits.
3. Submit copies of permits prior to performance of Work authorized by permits.

B. Existing Conditions

1. Use of Premises and Off-site Work
 - a. The Work shall occur on the Owner's property within the limits of Work shown on the Drawings.
 - b. Obtain permits and approvals for use of any land and access thereto that is deemed necessary for the Work, where such land is not available for use by the Owner, including land for temporary construction facilities, access and egress, or for storage of materials. Confine apparatus and storage to such additional areas.
 - c. Obtain permits and written approvals from appropriate jurisdictional agencies for the use of premises not available for use by the Owner, including all offsite staging areas, borrow pits and waste areas. Submit copies of all permits and approvals to the Owner prior to using areas.
 - d. Provide for the disposal of waste materials off-site in accordance with all applicable laws.
 - e. Adhere to the limits of Work as indicated, to minimize obstruction to traffic and inconvenience to the Owner, general public, and residents in the vicinity of the Work, and to protect people and property. Keep fire hydrants on or adjacent to the Work accessible to firefighting equipment at all times.
 - f. Make temporary provisions for the use of sidewalks and maintain functioning gutters, stormwater systems, drainage ditches, and culverts.
 - g. Maintain public access to businesses and residences including driveways and parking lots at all times during the Work.

PART 2 PRODUCTS

2.1 MATERIALS FURNISHED BY OWNER

- A. The Owner will furnish and install site trees and line striping as shown in the project drawings.

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01140**WORK RESTRICTIONS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Work Schedule
 - 2. Construction Constraints
- B. Related Requirements
 - 1. Section 01310 - Coordination
 - 2. Section 01325 - Scheduling of Construction

1.2 SUBMITTALS

- A. Incorporate the requirements of this Section in the project schedule submitted under Section 01325.
- B. Action Submittals

1.3 WORK SCHEDULE

- A. Conduct the Work during daylight hours on Monday through Friday, and within the time between 7:00 a.m. and 5:00 p.m. No work is to be done on Owner's holidays, Saturdays, Sundays or outside of the work hours described above.
- B. Cutting of paved surfaces, excavation within any paved roadway, or pavement resurfacing activities is not allowed from November 15th to April 1st.

PART 2 PRODUCTS – NOT USED**PART 3 EXECUTION****3.1 SITE USAGE PLAN**

- A. Submit a site usage plan showing all proposed staging areas, locations of all office and storage trailers, and material laydown areas. The site usage plan should be a drawing showing the proposed locations and shall include on-site traffic modifications and temporary utilities as may be applicable.
- B. Soil stockpiles shall be protected and surrounded by erosion controls at the end of each work day.

END OF SECTION

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SECTION 01230

ALTERNATES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Alternate No. 1 – Deletion of a Portion of Concrete Block Wall and HMA Walkway

B. Related Requirements

1. Section 00410 – Form for General Bid
2. Section 01290 – Application and Certificate for Payment

1.2 DEFINITIONS

- A. Alternate: An amount proposed by Bidder and stated on the bid form for certain work defined in this Section 01230 that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change in the scope of construction to be completed either in quantity or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Price to incorporate the Alternate into the Work. No other adjustments are made to the Contract Price.

1.3 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent Work as necessary to completely integrate the Alternate into the Work.

1. Include as part of each Alternate miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the Alternate.

- B. Execute accepted Alternates under the same conditions as other Work of the Contract.

1.4 ALTERNATES

- A. Alternate No. 1 – Deletion of a Portion of Concrete Block Walls and HMA Walkway

1. General

- a. Alternate No.1 includes all work associated with the deletion of the extended HMA Ramp, and a portion of the concrete block walls, associated subdrains, and walkway handrails. The revised scope of wall and walkway work to be performed if Alternate No.1 is accepted is shown on drawings C-002A and C-003A.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01290

APPLICATION AND CERTIFICATE FOR PAYMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Definition and description of measurement and payment to be used for the Work
 - 2. Payment procedures
 - 3. Payment requests for stored materials
- B. Related Requirements
 - 1. Section 01295 - Schedule of Values

1.2 GENERAL

- A. The following paragraphs describe payment procedures for the work to be done under the respective items in the Bid Form.
- B. Each lump sum will be deemed to include an amount considered by the Contractor to be adequate to cover the Contractor's overhead and profit for each separately identified item.
- C. Except as provided for in Section 01295, no separate measurement or payment will be made for Work called for in Division 0 or Division 1 of the Contract Specifications, unless specifically covered under the Bid items listed below. All costs associated with this Work will be considered incidental to the Contract Bid price.
- D. Division 2 through Division 16 Work will be measured and paid for at the Contractor's lump sum Bid price as indicated on the Bid form. Those payable Work items, and related prices as Bid, will be the basis for all compensation to the Contractor for Work performed under this Contract. Work not specifically included as a Bid item, but which is required to properly and satisfactorily complete the Work is considered ancillary and incidental to the Bid item Work, and payment for such Work is considered to be included in the values as Bid for payable items.

1.3 LUMP SUM ITEMS

- A. Each lump sum price stated in the Bid form shall constitute full compensation for all labor, equipment and materials necessary and required to complete the work specified under that particular item, and also all costs for doing related work as set forth in the Contract Documents or implied in carrying out their intent.
- B. Item 1 – Theater Park and Parking Lot Redevelopment
 - 1. Measurement

- a. There will be no measurement of quantities for lump sum items. Periodic partial payments for this Work, included under the Agreement, shall be based on the percent completion of each work item listed in the Schedule of Values provided under Section 01295 estimated by the Contractor and approved by the Engineer.

2. Payment

- a. The lump sum payment shall be full compensation for furnishing all labor, materials, tools, equipment, and services necessary for the construction of the Theater Park and Parking Lot Redevelopment Project in its entirety as detailed in the Contract Documents.

1.4 PAYMENT PROCEDURES

A. Informal submittal: Unless otherwise directed by the Engineer:

1. Make an informal submittal of request for payment by filling in, with erasable pencil, pertinent portions of EJCDC C-620, Contractor's Application for Payment, plus continuation sheet or sheets.
2. Make this preliminary submittal to the Engineer at the last regular job meeting of each month.
3. Revise the preliminary submittal as approved by the Engineer and incorporate the approved payments into the formal submittal.

B. Formal submittal: Unless otherwise directed by the Engineer:

1. Make formal submittal of request for payment by filling in the agreed data, by typewriter or electronically on EJCDC C-620, Contractor's Application for Payment, plus continuation sheet or sheets.
2. Sign and notarize the Application for Payment.
3. Submit the original of the Application for Payment, plus six identical copies of the continuation sheet or sheets, to the Engineer.
4. The Engineer will compare the formal submittal with the approved informal submittal and, if acceptable, will sign the Contractor's Application for Payment, and present the Application to the Owner.
5. Provide a signed and notarized Certificate for Stored Materials and proof of storage in a dry, watertight, heated and insured warehouse facility.

1.5 PAYMENT REQUESTS FOR STORED MATERIALS

- A. Requests for payment for stored materials shall be made in accordance with Section 00700 and shall be accompanied by the attached "Certificate for Stored Materials" form. Payment for stored materials shall not exceed the value actually paid by the Contractor for the stored materials as evidenced by the accompanying bill of sale, invoice, or other documentation.
- B. Partial payment requests for materials stored or so-called "engineering costs" by equipment manufacturers will not be allowed. All such costs shall be distributed proportionately among the various items of equipment/hardware to be furnished.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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CERTIFICATE FOR STORED MATERIALS

Tighe & Bond Project No.

We, _____, request payment for materials and/or equipment not incorporated in the work included under our firm's contract with _____ as listed below.

We hereby certify under penalty of perjury, that the materials not incorporated in the work have been delivered and are securely stored at the site or at _____ and that we have title to said materials free and clear of all Liens, as evidenced by the attached bill of sale, invoice, or other documentation.

We also certify that an inventory of said materials and/or equipment has been compiled for the purposes of this monthly partial payment request. This list of materials and/or equipment, including unit prices for said material not incorporated in the work for which payment is hereby requested, consisting of _____ pages and dated _____, is signed and attached hereto.

We acknowledge that payments made based on this request for materials and/or equipment not incorporated in the work does not relieve the contractor of its responsibility for furnishing all materials and equipment required for the satisfactory completion of the project pursuant to the contractual requirements.

We further certify that we can and will adequately protect said materials and/or equipment until they are incorporated in the work; that they meet the requirements of the specifications, and that they will be needed for incorporation in the work in the near future.

IN WITNESS WHEREOF, we, the said _____ h-
ereunto set our hand and seal this _____ day of _____, 20__.

Contractor's Firm Name

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF

By _____

Title _____

Notary Public

SCHEDULE OF STORED MATERIALS

Job No. _____
Contract No. _____
Contractor: _____
Location: _____

Date _____
Pay Estimate _____

Item	Description	Supplier/Manufacturer	Quantity Stored and not Incorporated	Unit \$	Certified Value

Signature: _____
Contractor's Principal

Total Amount Due for Stored Materials _____

Title: _____

SECTION 01295**SCHEDULE OF VALUES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Schedule of Values

1.2 SUBMITTALS

- A. Action Submittals
 - 1. Submit 3 copies of the Schedule of Values for approval within 10 days after the Effective Date of the Agreement.

1.3 SCHEDULE OF VALUES

- A. Schedule of Values shall be a detailed breakdown of the lump sum Work items showing values allocated to the various elements of the Work.
- B. The format of the Schedule of Values shall be a breakdown by Specification Section and content and shall be submitted on EJCDC C-620, Contractor's Application for Payment. The Engineer may require additional detailed documentation to support the values in the form of executed purchase orders, subcontracts, or other agreements.
- C. The Engineer will determine the level of breakdown and detail required. The breakdown shall include materials, installation, and start-up for equipment and controls where applicable. The final document will be the basis of payment requests for the duration of the Contract. No progress payment will be made until the Schedule of Values is approved by the Engineer.
- D. An unbalanced Schedule of Values providing overpayment on items of work performed first will not be accepted.

PART 2 PRODUCTS – NOT USED**PART 3 EXECUTION – NOT USED****END OF SECTION**

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SECTION 01310

COORDINATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Project Management
 - 2. Coordination
 - 3. Project Meetings
- B. Related Requirements
 - 1. Section 01140 - Work Restrictions
 - 2. Section 01325 - Scheduling of Construction
- C. Related Work Not Included
 - 1. Operation of existing facilities will be performed by the Owner unless otherwise specified.

1.2 SUBMITTALS

- A. Incorporate the requirements of this Section, as well as Work which may impact the existing system operation, or the operations of any adjacent utility, in the project schedule submitted under Section 01325.
- B. Informational Submittals
 - 1. At the pre-construction conference, supply to the Owner the cell phone number of a responsible person who may be contacted during off-hours for emergencies 24 hours a day, seven days a week.
 - 2. Prepare a contact list, including cell phone numbers, and emails for all Project personnel and submit to the Engineer at the pre-construction conference. Include Contractor, Owner, Engineer, and City personnel including police, fire, and ambulance.

1.3 PROJECT MANAGEMENT

- A. Retain a full-time Superintendent, satisfactory to the Owner and Engineer. The Superintendent shall not be changed except with the consent of the Owner and Engineer. The Superintendent shall be in full charge of the Work.
- B. Complete the Work in a continuous uninterrupted operation. Use sufficient personnel and adequate equipment to complete the Work within the Contract Time.

1.4 COORDINATION

- A. Coordinate with appropriate utility companies, as well as with the Owner, where the Work crosses or is adjacent to existing utilities.

1.5 PROJECT MEETINGS

A. Pre-Construction Conference

1. The Contractor shall be prepared to discuss the following subjects at the Pre-Construction Conference. Documentation for these items is required to be submitted within the time frames included in individual specification sections.
 - a. Project scheduling
 - b. Sequencing of critical path Work items
 - c. Shop Drawing procedures
 - d. Project changes and clarification procedures
 - e. Use of sites, access to Work areas, office and storage areas, security and temporary facilities
 - f. Contractor safety plan and representative
 - g. Progress payments and procedures
 - h. Required documentation
 - i. Project personnel contact list

B. Progress Meetings

1. Progress meetings will be held as requested by the Owner or as required by the Progress of the Work.
2. The Contractor's Superintendent shall attend all progress meetings.
3. At a minimum, progress meetings will review Work progress, schedule, Shop Drawing submission schedule, Applications for Payment, and other matters needing discussion and resolution.
4. Review the schedule with all parties to be affected by upcoming work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL

- A. Notify DIGSAFE at 1-888-344-7233 at least 72 hours prior to any digging, trenching, rock removal, demolition, borings, backfill, grading, landscaping, or any other earth moving operations.

3.2 SEQUENCE OF CONSTRUCTION

- A. Provide a detailed construction schedule as required in Section 01325.

END OF SECTION

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SECTION 01320**CONSTRUCTION PHOTOGRAPHS****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Photographs taken at specified intervals before, during and after construction.

1.2 SUBMITTALS**A. Informational Submittals**

1. Submit electronic files of each photograph on a CD or USB flash drive.

PART 2 PRODUCTS**2.1 CONSTRUCTION PHOTOGRAPHS**

- A. Electronic files shall be in .jpg format.

PART 3 EXECUTION**3.1 PRECONSTRUCTION PHOTOGRAPHY**

- A. The preconstruction area to be photographed shall include, but not be limited to, the area within and adjacent to the proposed construction, including roadways, utilities, driveways, landscaping, trees, structures and buildings.

3.2 PROGRESS PHOTOGRAPHY

- A. Take construction photographs of active work areas at least every 2 weeks throughout the life of the Contract. The photographs shall be indicative of the work that is currently in progress. A minimum of 3 photographs shall be taken at each scheduled interval at each location where Work is in progress.
- B. Take photographs of all utility abandonments.

3.3 POST-CONSTRUCTION PHOTOGRAPHY

- A. Provide post construction photography after all Work has been completed at each location. The locations to be photographed and the number of photographs required shall be as specified in Paragraph 3.1 for the preconstruction photography.

END OF SECTION

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SECTION 01325

SCHEDULING OF CONSTRUCTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Milestones
 - 2. Progress Schedule
- B. Related Requirements
 - 1. Section 01140 - Work Restrictions
 - 2. Section 01310 - Coordination

1.2 REFERENCES

- A. The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry, an Associated General Contractors (AGC) of America publication.

1.3 MILESTONES

- A. Substantial completion of the project shall be on or before April 1, 2019.
- B. Final completion of the project shall be on or before May 1, 2019.
- C. If, in the opinion of the Owner, the progress of the Work is insufficient to achieve the scheduled completion of the milestone, the Contractor shall be required to take such measures as are necessary to achieve completion by the milestone date. Such measures may include, but shall not be limited to, employing additional equipment and personnel, working overtime, added shifts or any combination thereof, all at no additional cost to the Owner.

1.4 PROGRESS SCHEDULE

- A. Graphically show the order and interdependence of activities, sequence of Work, how the start of a given activity depends on completion of preceding activities, and how completion of an activity may restrain the start of subsequent activities.
- B. The Work shall be planned by the Contractor and his Project field superintendent in coordination with all Subcontractors and Suppliers whose Work is shown on the Progress Schedule.
- C. Include, at a minimum, the following activities on the Progress Schedule:
 - 1. Project mobilization
 - 2. Submittal and approval of Shop Drawings
 - 3. Procurement of equipment and critical materials
 - 4. Installation of equipment and critical materials

5. Fabrication of special equipment and material, and its installation and testing
 6. Final inspecting and testing
 7. Punchlist
 8. Final cleanup
 9. Other activities that may be critical to the Progress Schedule
 10. All activities of the Owner and the Engineer which affect progress and/or affect required dates for completion of the Work
- D. Take into consideration Shop Drawing submittal and approval time, the delivery times of equipment and materials, Subcontractors' Work, availability and abilities of workmen, weather conditions, any restrictions in operations at the Work site, and all other items that may affect completion of the Work within the Contract Time.
- E. The Progress Schedule shall reflect the requirements and constraints outlined in Section 01310, Coordination.
- F. The Progress Schedule shall reflect Work restrictions outlined in Section 01140.
- G. Show information in such detail that duration times of activities will range from one to 15 days. The selection and number of activities shall be subject to the approval of the Owner and Engineer.
- H. The Progress Schedule should show preceding and following event numbers for each activity, description of each activity, and activity duration in calendar days.

1.5 SUBMITTALS

- A. Informational Submittals
1. Submit four prints of the preliminary Progress Schedule prepared in accordance with the requirements of this section. Progress schedule must be submitted within 10 days after the Effective Date of the Agreement. Progress Schedule must be approved by the Owner and Engineer before the first progress payment will be made.
 2. Revised analyses - Within 10 days after receipt of the review comments, submit four prints of the Progress Schedule revised in accordance with those comments.
 3. Periodic reports - On the first progress meeting of each month, submit four prints of the updated Progress Schedule, as well as a report of construction activities in the prior month.
 4. Before initiating the Work, submit an estimated monthly rate of Contractor payments for the project. If the payment schedule deviates from the original projection, submit a revised rate of expenditure schedule.

1.6 PERIODIC REPORTS

- A. At the first scheduled progress meeting of each month, present four copies of a construction report which details the Work performed during the preceding period. The report shall include the following at a minimum:

1. Actual progress of Work. Update the Progress Schedule accordingly.
2. The Progress Schedule, or revised Progress Schedule, should show the portions of the Progress Schedule impacted by the Work progress.
3. Activities or portions of activities completed during the reporting period, and their total value as basis for Contractor's periodic request for payment. Payment made will be based on the total value of such activities completed or partially completed after verification by the Engineer.
4. State the percentage of the Work actually completed and scheduled as of the report date, and the progress along the critical path in terms of days ahead of or behind the dates defined in the Progress Schedule.
5. If the Work is behind the dates set forth in the Progress Schedule, also report progress along other paths with negative slack.
6. Include a narrative which includes:
 - a. A description of problem areas, anticipated and current
 - b. Delaying factors and their impact
 - c. An explanation of corrective actions taken or proposed
7. Show the date of latest revision.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Action Submittals
 - 2. Informational Submittals

1.2 DEFINITIONS

- A. Action Submittals – includes written and graphic information submitted by Contractor that requires Engineer's approval.
- B. Informational Submittals – includes information submitted by Contractor that does not require Engineer's approval. The Engineer will acknowledge receipt of such documents and provide comments when the submittals lack the detail required by the Contract Documents.

1.3 ACTION SUBMITTALS

- A. Shop Drawings
 - 1. Shop Drawings as defined in the General Conditions, and as specified in individual work sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation drawings, schedule information, piece part drawings, actual shopwork manufacturing instructions, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certification, as applicable to the Work.
 - 2. Shop Drawings shall be of standardized sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard size drawings shall be
 - a. 24-inches by 36-inches
 - b. 22-inches by 34-inches
 - c. 11-inches by 17-inches
 - d. 8.5-inches by 11-inches
 - 3. Submit Shop Drawings at the proper time so as to prevent delays in delivery of materials. Coordinate submittals for related or interdependent equipment.
 - 4. Advise the Engineer in writing of any deviations from the requirements of the Contract Documents.
 - 5. Check all Shop Drawings regarding measurements, size of members, materials, and details to determine if they conform to the Contract Documents. Shop Drawings found to be inaccurate, not in compliance, or

otherwise in error shall be returned to the Subcontractors or Suppliers for correction before submission to the Engineer. Drawings that are current shall be marked with the date, name, and approval stamp of the Contractor.

6. All details on Shop Drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the Shop Drawings before being submitted for approval.
 7. Detailed installation drawings (sewers, equipment, piping, electrical conduits and controls, HVAC work, and plumbing, etc.) shall be drawn to scale and fully dimensioned.
 8. No material or equipment shall be purchased or fabricated until the required Shop Drawings have been submitted and approved. Materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by the Shop Drawings.
 9. Until the necessary approval has been given, do not proceed with any portion of the work, the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which approval is required.
 10. If submitted equipment requires modifications to the structures, piping, layout, or other details shown on the Drawings, details of the proposed modifications must also be submitted for approval. If such equipment and modifications are approved, perform all Work necessary to make such modifications at no additional cost to the Owner.
- B. Product Data: Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing, and printed product warranties, as applicable to the Work.
- C. Samples and color selection charts: Provide sample, when requested by individual Specification to establish conformance with the Specifications, and as necessary to define color, texture and pattern selections available.
- D. Operation and Maintenance Manuals: In accordance with Section 01770.
- E. Schedule of Values: In accordance with Section 01295.
- F. Site Usage Plan: In accordance with Section 01140.

1.4 INFORMATIONAL SUBMITTALS

- A. Schedule of Submittals

1. Submit a preliminary Schedule of Submittals within 10 days of the Effective Date of the Agreement in accordance with Article 2.05 of Section 00700.
- B. Schedule of Manufacturers and Suppliers
 1. Submit a schedule of manufacturers and Suppliers within 7 days after Notice to Proceed including the names and addresses of the manufacturers and Suppliers of materials and equipment to be incorporated into the Work.
- C. Schedule of Major Products
 1. Submit a schedule of major products within 30 days after Notice to Proceed including a complete list of major products proposed for use, with specification section number, name of manufacturer, trade name, and model number of each product.
- D. Product Listing and Manufacturers Qualifications
 1. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation and reference standards. Specifically identify the products, the anticipated schedule for delivery and storage, and the estimated value thereof for materials which the Contractor intends to request approval for off-site storage.
- E. Certificates of Compliance
 1. General:
 - a. Submit sworn certificates from the manufacturer or material supplier that the materials and fabrications provided under the Specification section conform with the Contract Documents.
 - b. Certificates shall be signed by an officer of the manufacturer's corporation and witnessed by a Notary Public.
 2. Welding: Submit in accordance with individual Specification sections.
 3. Installer: Prepare written statements on manufacturer's letterhead certifying that installer complies with requirements as specified in individual Specification sections.
 4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
 5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency, or when specified in individual Specification sections.
 6. Manufacturer's Certificate of Compliance: In accordance with individual Specification sections.
- F. Application for Payment
 1. Submit applications for payment in accordance with Section 01270, Measurement and Payment or Section 01290, Application and Certificate for Payment.

2. Submit schedule of stored materials when requesting payment for materials not yet installed.
- G. Construction Photography and Videography: Provide preconstruction, progress, and post-construction photography and videography in accordance with Sections 01320 and 01321.
- H. Contract Closeout Submittals: In accordance with Section 01770.
- I. Contractor Design Data
1. Written and graphic information
 2. List of assumptions
 3. List of performance and design criteria
 4. Summary of loads or load diagram
 5. Calculations
 6. List of applicable codes and regulations
 7. Name and version of software
 8. Information requested in individual Specification section
- J. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification sections.
- K. Schedules - Submit construction progress schedules and schedule updates in accordance with Section 01325.
- L. Statement of Qualifications: Submit evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty subcontractor, trade, specialist, consultant, installer, and other professionals.
- M. Submittals Required by Laws, Regulations, and Governing Agencies
1. Submit promptly notifications, reports, certifications, payrolls, and other required information as may be required, directly to the applicable federal, state, or local governing agency or their representative.
 2. Transmit to Engineer for Owner's records, one copy of correspondence and transmittals (including enclosures and attachments) between Contractor and governing agency.
- N. Test and Inspection Reports
1. Submit test and inspection reports as required by individual Specification sections.
 2. Test and inspection reports shall contain signature of person responsible for test or report.

3. Reports shall include identification of product and Specification, project name, date and time of test, type of test, location, test results, corrective action required if report indicates test is not in compliance with Contract Documents, interpretation of test results, and other information as required in individual Specification sections.
- O. Equipment Data: Submit information on equipment to be used in the performance of the Work as required by individual Specification sections.
- P. Testing and Start-up Data: Prepare and submit testing procedures proposed to perform testing required by individual Specification sections.
- Q. Vendor Training Plan: At least two weeks prior to scheduling training of Owner's personnel, submit lesson plans for vendor training in accordance with individual Specification section and manufacturer's Operations and Maintenance Manuals.
- R. Health & Safety Plans: When specified in individual Specification sections, prepare and submit a Health and Safety Plan modified or supplemented to include job-specific considerations.
- S. Submittals stamped by another Professional Engineer: When specified in individual Specification sections, prepare and submit calculations and/or drawings stamped by a Professional Engineer licensed in the State where the work is being performed.
- T. Coordination Drawings: When specified in individual Specification sections, prepare and submit drawings to show how multiple system and interdisciplinary work will be coordinated. Examples are conduit routing diagrams, duct layouts, utility coordination drawings, sprinkler plans etc.
- U. Work Plans: When specified in individual Specification sections, prepare and submit copies of all work plans needed to demonstrate to the Owner that Contractor has adequately thought-out the means and methods of construction and their interface with existing facilities.
- V. Erosion Control Plan: When specified in Contract Documents or required by local ordinances or regulations, prepare and submit copies of erosion control plans.
- W. Traffic Control Plan: When specified in Contract Documents or required by local ordinances or regulations, prepare and submit copies of traffic control plans.
- X. Shutdown Requests: Submit notification of any outages required (electrical, flow processes, etc.) as may be required to tie-in new work into existing facilities. Unless otherwise specified, provide outage requests a minimum of 7 days' notice shall be provided.
- Y. Equipment Data: When specified in other Specification sections, information on equipment used by the Contractor to complete the Work, such as compaction equipment and closed-circuit television inspection equipment.

1.5 PROCEDURES

A. Coordination

1. Prepare and submit documentation in advance of fabrication and product manufacturer, so that the installation will not be delayed, other related work

can be properly coordinated, and there is adequate time for review and resubmission, if required.

2. Provide no less than 30 days for review of submittals from the time received by the Engineer. For submittals of major equipment, that require more than 30 days to review, due to complexity and detail or those requiring review by multiple engineering disciplines, Engineer will notify Contractor of the circumstances and identify the anticipated date when the submittal will be returned.
 3. Re-submittals will be subject to same review time.
 4. No extension of time will be authorized due to failure to provide approvable submittals sufficiently in advance of the Work.
- B. Review Shop Drawings, product data, and samples prior to submission and verify and determine:
1. Field measurements
 2. Conformance with the Contract Documents. Advise the Engineer in writing of any deviations from the requirements of the Contract Documents.
 3. Delete or strike out information that is not applicable to the Work.
- C. Upload the electronic submittal files via Procore. Access to Procore will be provided by the Engineer. Files must be in .pdf format. The submittals will be returned in electronic .pdf format via Procore.
- D. Numbering: Submissions shall be accompanied by a transmittal form referencing the project name and applicable Specification section. Submittals shall be numbered sequentially, with the applicable Specification section and a hyphen preceding the number. (*e.g.* Submittal number 11330-01) Resubmittals shall bear the same transmittal number with a sequential letter suffix commencing with "A". (*e.g.* Submittal number 11330-01A)
- E. Provide a copy of the Submittal certification form (copy attached at the end of this section) which shall be attached to every copy of each Submittal as required under Article 7.16 A.2 of Section 00700. Apply the Contractor's stamp and initials or signature certifying that the submission has been thoroughly reviewed for completeness, compliance with the Contract Documents, coordination with adjacent construction and dimensional compatibility. Items submitted without the stamp or that are incomplete will be returned by the Engineer for rework and resubmission.
- F. Provide a copy of the P.E. certification form (copy attached at the end of this section) which shall be attached to every copy of each Submittal stamped by another Professional Engineer. Items submitted without the completed certification form will be returned by the Engineer for resubmission.
- G. Distribute copies of reviewed submittals along with the Engineer's transmittal to concerned parties with instructions to promptly report any inability to comply with the provisions or integrate the requirements with interfacing work.
- H. Partial and Incomplete Submittals

1. Shop Drawings shall be submitted as a complete package by Specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials, and samples associated with each Specification section be included as a single submittal for the Engineer's review.
 2. Engineer will return entire submittals if preliminary review deems it incomplete including:
 - a. Missing or incomplete Submittal certification form
 - b. Insufficient number of copies
 - c. Missing content
 3. Partial submittals may be considered, at Engineer's option, only when necessary to expedite the Project.
 4. Partial submittals shall be clearly identified as such on the transmittal to identify missing components.
- I. Submittals not required by the Specification will be returned without review or action code.
- J. Resubmission
1. Make corrections and modifications required by the Engineer and resubmit until approved.
 2. Clearly identify changes made to submittals and indicate other changes that have been made other than those requested by the Engineer.
 3. A maximum of two re-submissions of each shop drawing will be reviewed, checked and commented upon without charge to the Contractor (total of 3 submittals). Any additional submissions which are required by the Engineer to fulfill the stipulations of the Contract Documents will be charged to the Contractor as described in paragraph 7.16.E.2 of Section 00700.
- K. Distribution
1. Distribute approved Shop Drawings and approved product data to the Project Site and elsewhere as required to communicate the information to Suppliers, Subcontractors, and field personnel.

1.6 ENGINEER'S REVIEW

- A. The Engineer will review submittals for design, general methods of construction and detailing. The Engineer's review and approval of submittals shall not be construed as a complete check nor does it relieve the Contractor from responsibility for any departures or deviations from the requirements of the Contract Documents unless he has, in writing, called the Engineer's attention to such deviations at the time of submission. It will not extend to means, methods, technique, sequences, or procedures of construction (except where specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto.

- B. The Engineer's review of the submittals shall not relieve the Contractor from the responsibility for proper fitting of the Work, or the responsibility of furnishing any work required by the Contract Documents which may not be indicated on the submittals. The Contractor shall be solely responsible for any quantities shown on the submittals.
- C. If the Contractor considers any correction indicated on the submittals to constitute a change to the Contract Documents, the Contractor shall provide written notice to the Engineer at least 7 working days prior to release for manufacture.
- D. When the submittals have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.
- E. Action submittals as defined in paragraph 1.2 will be reviewed and returned under one of the following codes:
 - 1. Approved (Action Code 1) is assigned when there are no notations or comments on the submittal. Equipment or materials may be released for manufacture, provided that it complies with requirements of the Contract Documents.
 - 2. Approved as Noted (Action Code 2) is assigned when there are notations or comments on the submittal, but the equipment or materials may still be released for manufacture. All notations and comments must be incorporated in the final product. Resubmission is not necessary.
 - 3. Revise and Resubmit (Action Code 3) is assigned when there are notations and comments requiring a resubmittal of the package. Work cannot proceed until the submittal is revised and resubmitted for review.
 - 4. Not Approved (Action Code 4) is assigned when the submittal contains non-specified items or does not meet the requirements of the Contract Documents. It may also be assigned when there is a significant amount of missing material required for the Engineer to perform a complete review. The entire package must be resubmitted, revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the Contract Documents.
- F. Informational submittals as defined in paragraph 1.2 do not require approval by the Engineer. Such submittals will be returned under one of the following codes:
 - 1. Receipt Acknowledged (Action Code 5) is assigned when the submittal is provided for documentation purposes and is acknowledged as received. Comments may be noted using this action code.
 - 2. Revise and Resubmit (Action Code 6) is assigned when there are notations and comments requiring a resubmittal of the package.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SUBMITTAL CERTIFICATION FORM

PROJECT: _____
ENGINEER: _____ ENGINEER'S PROJECT NO.: _____
CONTRACTOR: _____ CONTRACTOR'S PROJECT
NO.: _____

TRANSMITTAL NO.: _____ SUBMITTAL NO.: _____
SPECIFICATION NO.: _____ DRAWING NO: _____
DESCRIPTION: _____
MANUFACTURER: _____

The above referenced submittal has been reviewed by the undersigned and I/we certify that the materials and/or equipment meets or exceeds the project specification requirements; that field measurements, dimensions, quantities, specified performance criteria, installation requirements, materials, catalog numbers and related materials have been verified; that all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the work has been determined and verified; that review includes all information related to the contractor's sole responsibility for means, methods, techniques, sequences, and procedures of construction and safety; and item has been coordinated with the overall project with:

☐ NO DEVIATIONS

☐ A COMPLETE LIST OF DEVIATIONS AS FOLLOWS:

SUBMITTED BY: _____ DATE: _____

GENERAL CONTRACTOR'S STAMP

P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a professional engineer registered in the Commonwealth of Massachusetts and that he/she has been employed by

_____ to design
(Name of Contractor)

(Insert P.E. Responsibilities)

In accordance with Specification Section _____ for the

(Name of Project)

The undersigned further certifies that he/she has performed the said design in conformance with all applicable local, state and federal codes, rules and regulations; and, that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the

(Insert Name of Owner)

or Owner's representative within seven days following written request therefor by the Owner.

P.E. Name

Contractor's Name

Signature

Signature

Title

Title

Address

Address

SECTION 01520**CONSTRUCTION FACILITIES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Temporary sanitary and first-aid facilities

1.2 QUALITY ASSURANCE

- A. Maintain temporary construction facilities in proper and safe condition throughout the progress of the Work.

1.3 TEMPORARY SANITARY AND FIRST AID FACILITIES

- A. Provide suitably enclosed chemical or self-contained toilets for the use of the labor force employed on the Work. Toilets shall be located near the Work sites and secluded from observation insofar as possible. Toilets shall be serviced weekly, kept clean and supplied throughout the course of the Work.
- B. Contractor shall enforce proper use of sanitary facilities.
- C. Use of the Owner's sanitary facilities by the Contractor is prohibited.
- D. Provide a first aid station at the site.

PART 2 PRODUCTS – NOT USED**PART 3 EXECUTION – NOT USED****END OF SECTION**

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SECTION 01560
TEMPORARY BARRIERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Temporary Fencing System
- B. Related Requirements
 - 1. Section 01720, Field Engineering

1.2 SUBMITTALS

- A. Informational Submittals
 - 1. Submit information regarding the proposed temporary fencing system, including material of construction, plan layout, spacing of components, and anchorage.

1.3 TEMPORARY FENCING SYSTEM

- A. Comply with the requirements of 520 CMR 14.00, and the local and/or regional permit required to be obtained as part of this regulation, for temporary fencing.
- B. Do not move the fence system under any circumstances until the proposed construction and restoration activities are complete.
- C. The Contractor will retain ownership of the temporary fencing system after the completion of the Work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Temporary fencing shall be orange, 48" high and manufactured from high density polyethylene with 4" x 1" mesh size.
- B. Temporary fencing material shall meet the following requirements within +/- 5%:
 - 1. Machine Direction Breaking Load: 1210 lbs/ft
 - 2. Machine Direction Yield Strength: 1350 lbs/ft
 - 3. Machine Direction Breaking Elongation: 33%
 - 4. Machine Direction Yield Point Elongation: 13%
 - 5. Tensile Breaking Load: 340 lbs/ft
 - 6. Tensile Yield Strength: 440 lbs/ft

- | | | |
|----|--------------------------------|-----|
| 7. | Tensile Breaking Elongation: | 21% |
| 8. | Tensile Yield Point Elongation | 8% |

PART 3 EXECUTION**3.1 FENCE INSTALLATION**

- A. Install fence according to manufacturer's instructions at locations specified in Paragraphs 1.3 above.

END OF SECTION

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SECTION 01570

TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Dust control
 - 2. Sediment trapping devices
- B. Related Requirements
 - 1. Section 02920 – Lawns and Grasses

1.2 SUBMITTALS

- A. Informational Submittals
 - 1. Materials proposed for use in dust control
 - 2. Sediment trapping devices

PART 2 PRODUCTS

2.1 SEDIMENT TRAPPING DEVICES

- A. Sediment trapping devices shall be Siltsack®, Dandy Bag II®, or equal.

PART 3 EXECUTION

3.1 DUST CONTROL

- A. Control dust during the Work. Use a mechanical street sweeper as necessary.
- B. Prevent dust from becoming a nuisance or hazard. During construction, excavated material and open or stripped areas are to be policed and controlled to prevent spreading of the material.
- C. Control dust during the work on-site using calcium chloride and/or water.
- D. During the Work on-site, all paved road and driveway surfaces shall be scraped and broomed free of excavated materials on a daily basis. The surfaces shall be hosed down or otherwise treated to eliminate active or potential dust conditions and the natural road or wearing surface shall be exposed.
- E. Ensure that the existing equipment, facilities, and occupied space adjacent to or nearby areas of the work do not come in contact with dust or debris as a result of concrete demolition, excavation or surface preparation for coatings.

3.2 DRAINAGE AND EROSION CONTROL

- A. Control erosion and siltation during the construction through mulching, haybales, siltation fencing, diversion and control of storm water run-off, ponding areas and similar methods.

- B. Provide and maintain sediment trapping systems.
- C. Discharge surface runoff from any disturbances to the site into silt containment basins. Utilize siltation prevention measures including haybale and geotextile fences before discharge to drainage systems.
- D. Install sediment trapping devices in catch basins located in existing paved areas with sediment trapping devices to minimize the transport of sediment through the subsurface stormwater collection system.
- E. Protect all temporary soil stockpiles with haybales and siltation fencing.

3.3 RESTORATION

- A. Provide erosion control, seed and mulch and netting for surface restoration of areas disturbed during construction activities.
- B. Provide temporary stabilization of disturbed areas that remain inactive greater than 14 consecutive days to minimize erosion. Methods to minimize erosion may include but are not limited to:
 - 1. Spreading straw and/or providing temporary planting stabilization.
 - 2. Installing jute netting.
 - 3. Preparing surfaces to increase the runoff flow path, reduce the runoff flow velocity, or create small storage pockets to retain surface flows. Methods of accomplishing this include using mechanical devices such as track equipment or sheep's foot rollers.
- C. Place mulch on seeded areas. Use jute netting on areas having a slope greater than 3 horizontal to 1 vertical, to anchor the mulch until a satisfactory growth is obtained. If seeding is not possible because of the time of the year, apply mulch and netting to stabilize the area until such time as seed can be sown.
- D. Provide grading, refertilizing, reseeding, remulching and/or netting to maintain the restored areas until the Work is accepted by the Owner.
- E. Seed shall be as specified under Section 02920.

3.4 CLEANING

- A. Remove any sediment that builds up around the haybales or catchbasins.
- B. Clean sediment trapping devices periodically during the Work. Devices shall be cleaned on a weekly basis, or more frequently if the devices become clogged.
- C. Clean catchbasins that collect sediment as a result of the Work.

END OF SECTION

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SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Products and Materials
 - 2. Product Delivery Requirements
 - 3. Packaging, Handling and Storage Requirements
 - 4. Inspection of Offsite Work

1.2 QUALITY ASSURANCE

- A. Review all contract Drawings and Specifications with respect to specific system characteristics, applicability of materials and equipment for the intended purposes, sizes, orientation, and interface with other systems, both existing and proposed, and certify that the materials and equipment proposed will perform as specified prior to submitting shop drawings.
- B. Provide sworn certificates as to quality and quantity of materials where specified or requested by the Engineer.
- C. Obtain concurrence of the Engineer prior to processing, fabricating, or delivering material or equipment.

1.3 PRODUCTS AND MATERIALS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by a single manufacturer unless specified otherwise.
- B. Use only new and first quality material in the Work. Material shall conform to the requirements of these Specifications and be approved by the Engineer. If, after trial, it is found that sources of supply that have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved materials from other approved sources.
- C. Immediately remove defective materials and equipment from the site, at no additional cost to the Owner. The Contractor may be required to furnish sworn certificates as to the quality and quantity of materials before materials are incorporated in the Work.
- D. Engineer has the right to approve the source of supply of all material prior to delivery.

1.4 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- D. Progressively deliver materials and equipment to the Site so there will be neither delay in progress of the Work nor an accumulation of material that is not to be used within a reasonable time.
- E. Deliver products to the Site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to the manufacturer, grade, quality, source, and other pertinent information.

1.5 PACKAGING, HANDLING AND STORAGE REQUIREMENTS

- A. Provide storage and handling of all materials and equipment required for the Work.
- B. Except as otherwise indicated in the Contract Documents, determine and comply with the manufacturer's recommendations on product storage, handling, and protection. Provide manufacturer's documentation on recommended storage procedures when requested by the Engineer.
- C. Properly store and protect all equipment immediately upon its arrival. All equipment shall be stored in a clean, dry, heated, secured, and insured indoor facility satisfactory to the Engineer. Equip drive motors with thermostatically controlled strip heaters. Outdoor storage with plastic, canvas, plywood or other cover will not be allowed except where specific approval for designated items not containing electrical components or bearings is obtained from the Engineer. This approval does not relieve the Contractor of responsibility for proper protection of materials.
- D. Familiarize workmen and subcontractors with hazards associated with materials, equipment, and chemicals specified herein and take all necessary safety precautions.
- E. Areas available on the construction site for storage of material and equipment shall be as shown on the Drawings or approved by the Owner.
- F. Materials and equipment to be incorporated in the Work shall be handled and stored by the manufacturer, fabricator, supplier, and Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft, or damage of any kind to the material or equipment.
- G. Protect finished surfaces including floor surfaces, stairs, joints, and soffits of passageways from damage until accepted by the Engineer.
- H. Promptly remove materials from the site of the Work which have become damaged or are unfit for the use intended or specified. The Contractor will not be compensated for the damaged materials or their removal costs.
- I. Handle, haul, and distribute all materials and all surplus materials on the different portions of the Work, as necessary or required. Provide suitable and adequate storage room for materials and equipment during the progress of the Work, and be

responsible for the protection, loss of, or damage to materials and equipment furnished, until the final completion and acceptance of the Work.

- J. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.
- K. All materials and equipment to be incorporated in the Work shall be placed so as to not damage any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Keep materials and equipment neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to the Owner.
- L. No material or equipment will be permitted to be stored in any of the Owner's facilities, unless otherwise approved by the Engineer.
- M. Do not store material or equipment in any wetland or environmentally sensitive area. Stockpile sites shall be level, devoid of mature stands of natural vegetation, and removed from drainage facilities and features, wetlands, and stream corridors.
- N. Contractor shall be fully responsible for loss or damage to stored materials and equipment.
- O. No item judged rusty, corroded or otherwise damaged during storage will be accepted. Any electrical or instrumentation item determined by the Engineer to be damaged shall be removed from the Site and replaced by a completely new item in first class condition. Items not properly stored will not be considered for any partial payment.
- P. Provide protective and preventive maintenance during storage consisting of manually exercising equipment where required, inspecting mechanical surfaces for signs of corrosion or other damage, lubricating, applying any coatings as recommended by the equipment manufacturer as necessary for its protection and other precautions as necessary to assure proper protection of equipment stored.
- Q. Treat ferrous surfaces not receiving finish coats of paint with rust preventive coating, and protect non-ferrous metal work and devices with suitable wrappings.

1.6 INSPECTION OF OFFSITE WORK

- A. The Owner and Engineer will inspect Work performed away from the construction site during fabrication, manufacture, or testing, or before shipment. Give 2 weeks written notice regarding the place and time where such fabrication, manufacture, testing, or shipping will be done.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01630

PRODUCT SUBSTITUTION DURING CONSTRUCTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Product substitution procedures

1.2 CONTRACTOR'S OPTIONS

- A. For materials or equipment (hereinafter products) specified only by performance or reference standard, select product meeting that standard, by any Supplier. To the maximum extent possible, provide products of the same generic kind from a single source.
- B. For products specified by naming several products or manufacturers, select any one of the products or Suppliers named, which fully complies with the Drawings and Specifications. Another "or-equal" product can also be considered by the Engineer if it complies with the provisions of Article 7.04, Section 00700. If a product proposed by the Contractor does not qualify as an "or-equal" item, then it can be considered as a proposed substitute item, and the Contractor must comply with the requirements of Article 7.05, Section 00700.
- C. For products specified by naming products or manufacturers and followed by words indicating that no "or-equal" item or substitution is permitted, there is no option and no substitution will be allowed.
- D. Where more than one choice is available as a Contractor's option, select product that is compatible with other products already selected or specified.

1.3 SUBSTITUTIONS

- A. If in the Engineer's sole discretion a product proposed by the Contractor does not qualify as an "or-equal" item under the provisions of Article 7.04 of Section 00700, it can be considered a proposed substitute item. Submit information required under Article 7.05, Section 00700 for proposed substitutes.
- B. The Engineer will consider written requests from the Contractor for substitutions within 30 days after the Notice to Proceed. After this period, requests will be considered only in case of unavailability of product or other conditions beyond control of the Contractor.
- C. Submit 5 copies of request for substitutions. Submit a separate request for each proposed substitution. In addition to the submittal requirements outlined in Article 7.05 of Section 00700, include the following in each substitution request:
 - 1. For products or Suppliers:
 - a. Product identification, including Supplier & manufacturer's name and address.

- b. Manufacturer's literature with product description, performance and test data, and reference standards.
 - c. Samples, if appropriate.
 - d. Name and address of similar projects on which product was used, and date of installation.
- 2. For construction methods (if specified):
 - a. Detailed description of proposed method.
 - b. Drawings illustrating method.
- 3. Such other data as the Engineer may require to establish that the proposed substitution is equal to the product, Supplier or method specified.
- D. The substitution request shall include written certification and statements that are outlined in Article 7.05 of Section 00700.
- E. A request constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same or better guarantees, warranties or bonds for proposed substitution as for specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives all claims for additional costs or time extension which may subsequently become apparent.
 - 5. Will reimburse Owner for review or redesign services associated with re-approval by authorities having jurisdiction.
- F. A proposed substitution will not be accepted if:
 - 1. Acceptance will require changes in the design concept or a substantial revision of the Contract Documents.
 - 2. It will delay completion of the Work.
 - 3. It is intended or implied on a Shop Drawing and is not accompanied by a formal request for substitution from the Contractor.
- G. The Contractor is responsible for all costs relating to substitution requests.
- H. Approval of a substitution does not relieve the Contractor from the requirement for submission of Shop Drawings as set forth in the Contract Documents.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01720**FIELD ENGINEERING****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Establishment of lines, benchmarks, and elevations required to layout and construct the Work

1.2 SUBMITTALS**A. Informational Submittals**

1. Submit the qualifications of the Registered Professional Engineer and/or Registered Land surveyor to be hired to perform various portions of the Work, as applicable.
2. Submit documentation verifying the accuracy of field engineering work.
3. Submit 4 copies of final record drawings of field engineering layouts and as-built survey.
4. Submit certificate signed by registered (licensed) engineer or surveyor certifying that elevations and locations of Work are in conformance with Contract Documents. Explain deviations.

1.3 RECORDS

- A. Maintain a complete, accurate log of control and survey work as it progresses.

1.4 QUALITY ASSURANCE

- A. Employ a qualified engineer, registered with the Commonwealth of Massachusetts as a Professional Engineer or a competent surveyor, registered with the Commonwealth of Massachusetts as a Land Surveyor, as required for the particular characteristics of the work being performed.

PART 2 PRODUCTS - NOT USED**PART 3 EXECUTION****3.1 PROCEDURES**

- A. The Registered Professional Engineer or Land Surveyor provided shall establish and maintain lines, elevations and reference marks needed during the progress of the Work and shall re-establish stakes and marks placed by the Engineer that are lost or destroyed through the course of the Work. Verify such work by instrument or other appropriate means.
- B. The Engineer shall be permitted at all times to check the lines, elevations and reference marks, set by the Contractor, who shall correct any errors disclosed by such check. Such a check shall not be construed to be an approval of the Contractor's work and shall not relieve or diminish the responsibility of the

Contractor for the accurate and satisfactory construction and completion of the entire Work.

- C. Make, check, and be responsible for measurements and dimensions necessary for the proper construction of and the prevention of misfittings in the Work.
- D. Furnish all protective stakes and temporary structures for marking and maintaining points and lines for the building of the Work, and give the Engineer such facilities and materials for verifying said lines and points as he may require.
- E. Revisions to the layout and elevations of the Work as defined by the Contract Documents shall be approved by the Engineer.
- F. Maintain and prepare final record drawings of field engineering layouts and as-built survey conducted after completion of the Work.

END OF SECTION

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SECTION 01725**PRESERVATION AND RESTORATION OF PROJECT FEATURES****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Protection and replacement of trees, shrubs, signs, property markers, fences, and related project features.
2. Taking precautions, providing programs, and taking actions necessary to protect public and private property and facilities that are outside the demolition scope from damage.

1.2 DEFINITIONS**A. Underground Structures**

1. Underground structures are defined to include, but not be limited to, sewer, water, gas, and other piping, and manholes, chambers, electrical and signal conduits, tunnels and other existing subsurface work located within or adjacent to the limits of the Work.
2. Underground structures known to the Engineer are shown on the Drawings to the extent that locations are available. This information is shown for the assistance of the Contractor in accordance with the best information available, but is not guaranteed to be correct or complete. The Contractor shall be responsible for checking on the actual locations of water, sewer, gas electric and telephone service connection lines to avoid potential interferences.

B. Surface Structures

1. Surface structures are defined as existing buildings, structures and other facilities above the ground surface. Included with such structures are their foundations or any extension below the surface. Surface structures include, but are not limited to, buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks and all other facilities that are visible above the ground surface.

PART 2 PRODUCTS – NOT USED**PART 3 EXECUTION****3.1 REPAIR/RESTORATION**

- A. Trees, shrubs, and similar items shall not be removed except where indicated on the drawings or as necessary to access the required demolition work, as approved by the Engineer. Items to be removed shall be clearly marked as directed by the Engineer. If objects not to be removed are damaged or removed, they shall be repaired or replaced to their original condition.

- B. Trees and shrubs on private property, which are removed or damaged by the Contractor shall be replaced in kind.
- C. Signs, fences, property markers, walls, guard rails and other public or private property that are outside the demolition scope shall be replaced in kind if damaged. Supports and protective devices required shall be provided.
- D. Underground and Surface Structures
 - 1. In the event of damage, injury or loss to existing utilities and structures that were not indicated to be removed or abandoned, whether shown on the Drawings or not, make all reasonable efforts to facilitate repairs and to mitigate the impact of such events upon the utility or structure owner's normal operations. Restore the existing utility or structure to the condition required by the owner of the utility or structure or at least to the condition found immediately prior to the Work. In the event that the utility owner elects to make the repairs, provide all reasonable access and assistance, and reimburse the utility owner for the cost of repairs. If utility service is interrupted due to damage to facilities, alternate facilities shall be provided.
 - 2. All other existing surface facilities, including but not limited to, guard rails, posts, guard cables, signs, poles, markers and curbs which are temporarily removed to facilitate the Work shall be replaced and restored to their original condition at the Contractor's expense unless otherwise indicated in other sections of these specifications.
 - 3. Wherever water, sewer, gas or petroleum mains, electric or telephone lines, cables or other utilities and structures are encountered and may be in any way interfered with, inform the Engineer and the appropriate utility company. Cooperate with the Engineer and utility company in the protection, removal, relocation, and replacement of structures and facilities.
 - 4. Prior to proceeding with any demolition or construction, notify in writing owners of utilities and structures within the vicinity of the proposed Work.
 - 5. Work affecting water distribution systems, which will take fire hydrants out of service, must be coordinated with the local fire department. The Contractor shall be prepared to restore fire flows in the event of an emergency or to provide for temporary fire flow service in accordance with the requirements of the local fire department.
 - 6. Materials used for relocation or replacement of utilities and structures shall be of an equivalent material, type, class, grade and construction as the existing or as approved by the respective owners thereof, unless otherwise shown or specified.
 - 7. When any survey monument or property marker, whether of stone, concrete, wood or metal, is in the line of any trench or other demolition or construction work and may have to be removed, notify the Engineer in advance of removal. Under no circumstances shall any monument or marker be removed or disturbed by the Contractor or by any of his Subcontractors, employees or agents, without the permission of the Engineer. Monuments or markers removed or disturbed shall be reset by a land surveyor licensed in the State

where the Work is located at the Contractor's expense. Should any monuments or markers be destroyed through accident, neglect or as a result of the Work under this Contract, the Contractor shall, at his own expense, employ a land surveyor licensed in the State where the Work is located to re-establish the monument or marker.

3.2 PROTECTION

- A. The construction of certain portions of the project may require excavation within the root systems of trees. Roots with a diameter of 2 inches or more within the excavation shall not be cut. If necessary, excavation shall be made with small powered equipment or by hand to comply with this requirement. It may be necessary to excavate from more than one direction to avoid damage to the roots.
- B. The trunks of trees that are to remain and are within the swing radius of the excavating machine bucket when fully extended shall be wrapped with burlap and 2 inch by 4 inch protective wood slats (8 inch spacing maximum) wired around the circumference of the trees to protect them from damage.
- C. Tree limbs shall not be cut except upon written approval of the Owner and the Engineer. Tree limbs cut shall be painted with approved forestry paint manufactured specifically for that purpose.
- D. Underground and Surface Structures
 - 1. Sustain in their places and protect from direct or indirect injury underground and surface structures designated to remain within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure. Before proceeding with the work of sustaining and supporting such structure, satisfy the Engineer that the methods and procedures to be used have been approved by the party owning same.
 - 2. Pay utility service company charges related to the temporary support of utility poles if required to complete the Work.
 - 3. Assume risks associated with the presence of underground and surface structures within or adjacent to the limits of the Work. The Contractor shall be responsible for damage and expense for direct or indirect injury caused by his Work to any structure. Immediately repair damage caused by the Work to the satisfaction of the owner of the damaged structure.

END OF SECTION

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SECTION 01770

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Documentation required for the transfer of the completed Work to the Owner
2. Final Cleaning

1.2 SUBMITTALS

A. Closeout Submittals

1. As-built drawings
2. Evidence of payment and release of liens
3. List of Subcontractors, service organizations, and principal vendors

1.3 SUBSTANTIAL COMPLETION

- A. Refer to Article 15.03 in 00700, General Conditions, for procedures relating to obtaining Substantial Completion. Refer to 00520, Agreement, for Contract Times.

1.4 PROJECT CLOSEOUT DOCUMENTS

- A. As-Built Drawings - Submit as-built drawings for review, approval, or comment. The as-built drawings shall show the completed work, including all deviations from the original Drawings. As-built drawings shall depict the location of all piping and valves installed under this Contract, as well as field changes. Take swing ties to all underground work from a minimum of two horizontal locations. Vertical dimensions to all below grade work shall also be obtained. All fittings, bends, valves and other appurtenances shall be shown. At a minimum, the following information shall be shown on the as-built drawings.

1. Ties to all buried fittings (including tees, crosses, bends, reducers, wyes, offsets, adapters, sleeves, caps, plugs), valves, services and structures from two horizontal measurements to permanent surface reference points, and depth below permanent grade. Permanent surface reference points are manholes, catch basins, power poles, and above-grade structures.
2. Ties to all surface structures (including manholes, catch basins, vaults, valve boxes, hydrants, curb stops, cleanouts, wet wells, outlets, etc.) from two horizontal measurements to permanent surface reference points. Re-station surface structures if stationed on Drawings.
3. Ties to other utility crossings, abandoned pipelines, and sewer service stubs, from two horizontal measurements to permanent surface reference points include depth below permanent grade and spacing between crossing utilities.

4. Invert and rim elevation of all gravity pipelines and structures including manholes, catch basins, below-grade structures, wet wells, septic tanks and distribution boxes as appropriate.
 5. Depth of ledge at changes in profile but not more than 25-foot intervals.
 6. Changes to pipe size and materials.
- B. Operation and Maintenance manuals - Provide four copies of operation and maintenance manuals for each type of equipment provided on the project. Manuals shall include as a minimum:
1. Detailed service, maintenance and operation instructions for each item supplied
 2. Special maintenance requirements, along with special calibration and test procedures
 3. Operating instructions
 4. Preventative maintenance instructions
 5. Corrective-maintenance instructions
 6. Complete parts lists with stock numbers and name, address, and telephone number of the local supplier
- C. Provide warranties and bonds for items so listed in pertinent sections of the Project Manual.
- D. Provide evidence of compliance with requirements of governmental agencies having jurisdiction.
- E. As specified in Article 15.06.A of Section 00700, provide evidence that all Work, materials and equipment will pass to Owner free and clear of any Liens or other title defects upon final payment. Such evidence may take the form of receipts or releases from all Subcontractors and Suppliers and an affidavit from Contractor as to the completeness of the receipts and releases as described in Section 00700 Article 15.06.A.3.
- F. Provide list of Subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.

1.5 FINAL PAYMENT

- A. Refer to General Conditions for procedures relating to final inspection and payment.
- B. The Contract shall be considered complete and final payment made, only when:
1. All provisions of the Contract Documents have been strictly adhered to.
 2. The project and premises have been left in good order, including removal of all temporary construction, Contractor-owned and extraneous materials.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION**3.1 CLEANING**

- A. Remove and entirely dispose of material or debris that has washed, flowed or has been placed in existing watercourses, ditches, gutters, drains, pipe, or structures, for work done under the Contract work limits. Leave ditches, channels, drains, pipes, structures, and watercourses in a clean and neat condition upon completion of the Work.
- B. Restore or replace any public or private property damaged or removed during the course of the Work. Property shall be returned to a condition at least equal to that existing immediately prior to the beginning of operations. Complete all highway or driveway, walk, and landscaping work using suitable materials, equipment and methods. Perform restoration of existing property, signs or structures promptly as work progresses; do not leave restoration work until the end of the Contract Time.

END OF SECTION

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DIVISION 2 - SITE CONSTRUCTION

SECTION 02075

GEOSYNTHETICS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes
 - 1. Non-woven geotextiles
 - 2. Uniaxial Geogrids

1.2 REFERENCES

- A. Data Sheet DS1 - Non-Woven Geotextiles
- B. Data Sheet DS2 - Woven Geotextiles
- C. ASTM D1248 - Specification for Polyethylene Plastics Molding and Extrusion Materials
- D. ASTM D1388 - Test Methods for Stiffness of Fabrics
- E. ASTM D3786 - Test Method for Hydraulic Bursting Strength of Knitted Goods and Non-woven Fabrics: Diaphragm Bursting Strength Tester Method
- F. ASTM D4218 - Test Method for Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
- G. ASTM D4491 - Test Methods for Water Permeability of Geotextiles by Permittivity
- H. ASTM D4833 - Test Method for Index Puncture Resistance of Geotextiles Geomembranes and Related Products
- I. ASTM D5261 - Test Method for Measuring Mass per Unit Area of Geotextiles
- J. ASTM D5262 - Standard Test Method for Evaluating the Unconfined Tension Creep Behavior of Geosynthetics
- K. GRI-GG1 - Geogrid Rib Tensile Strength
- L. GRI-GC8 - Determination of the Allowable Flow Rate of a Drainage Geocomposite

1.3 SUBMITTALS

- A. Product samples and data for all geosynthetics proposed for use on this project.
- B. Manufacturer-approved construction quality assurance/quality control manual for all of the geosynthetics proposed for use on this project.
- C. Manufacturing quality control testing data specified. Submit certification of required performance testing on all geosynthetics by an independent laboratory and label and identify all geosynthetic products delivered to the site.
- D. Manufacturer's recommended installation details including, orientation, overlap, and joining/seaming information for all drainage geocomposite products.

1.4 QUALITY ASSURANCE

- A. Obtain from the geosynthetic product manufacturers a warranty that their products are free from defects in materials and workmanship at the time of delivery to the project site.
- B. Material found to be defective or which does not conform to these specifications will be rejected.

1.5 DELIVERY, STORAGE AND PROTECTION

- A. The Engineer reserves the right to reject and require replacement of any damaged materials delivered to the site, at no additional cost to the Owner.
- B. Stockpile and store the materials in accordance with the manufacturer's recommendations.
- C. Label and bag all geosynthetic rolls in packing that is resistant to photo degradation by ultraviolet (UV) radiation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Group 1 Non-Woven Geotextile
 - 1. "C-46NW" as manufactured by Contech Construction Products, Inc.
 - 2. "FX-40HS" as manufactured by Carthage Mills
 - 3. "140NC" as manufactured by Mirafi Inc.
 - 4. Or equal
- B. Group 2 Non-Woven Geotextile
 - 1. "4506" as manufactured by Amoco Fabrics and Fibers
 - 2. "FX-60HS" as manufactured by Carthage Mills
 - 3. "160N" as manufactured by Mirafi Inc.
 - 4. Or equal
- C. Group 3 Non-woven Geotextile
 - 1. "4508" as manufactured by Amoco Fabrics and Fibers
 - 2. "FX-80HS" as manufactured by Carthage Mills
 - 3. "180N" as manufactured by Mirafi Inc.
 - 4. Or equal
- D. Group 4 Non-woven Geotextile
 - 1. "4512" as manufactured by Amoco Fabrics and Fibers
 - 2. "350 EX" as manufactured by LINQ Industrial Fabrics
 - 3. "C-160 NW" as manufactured by Contech Construction Products, Inc.

- 4. Or equal
- E. Group 5 Non-woven Geotextile
 - 1. “4516” as manufactured by Amoco Fabrics and Fibers
 - 2. “FX160HS” as manufactured by Carthage Mills
 - 3. “UV 516” as manufactured by Tenax Corporation
 - 4. Or equal
- F. Group 1, HDPE Uniaxial Geogrid
 - 1. “UX 1400 HS” as manufactured by the Tensar Corporation, Morrow, GA
 - 2. Approved Equal

2.2 MATERIALS

- A. Non-woven geotextiles shall be manufactured from a continuous polypropylene filament. A needle punching process shall achieve bonding.
- B. Non-woven protection geotextiles shall have a minimum mass per unit area of 32oz/yd².
- C. All uniaxial geogrids shall consist of punched and longitudinally drawn high-density polyethylene sheets that have been elongated into a post-yield state where strength, modulus, and creep resistance have been substantially increased from the non-deformed state. The created apertures will be large enough to permit strike through of the surrounding soil medium.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect all products prior to the installation for any defects that may have been the result of storage and handling. The Engineer reserves the right to reject and require replacement of any damaged product, at no additional cost to the Owner.

3.2 INSTALLATION

- A. Install geosynthetic products in accordance with the approved manufacturer’s QA/QC manuals, project details, and pertinent sections of these Specifications.

3.3 QUALITY CONTROL

- A. The Engineer may remove a sample (i.e. a strip that is 3 feet long by the entire roll width) from a maximum of 1 roll of each 10 rolls of all geosynthetic materials delivered to the project, and submit the samples to an independent laboratory for analysis of the product to ensure that the geosynthetics meet the specifications herein.

END OF SECTION

(DATA SHEETS FOLLOW)

Data Sheet DS1 - Non-Woven Geotextile Mechanical Properties								
Property	Test Method	Units	Testing Frequency	Value				
				Group 1	Group 2	Group 3	Group 4	Group 5
Mass per Unit Area	ASTM D5261	oz/yd ²	1/150,000 ft ²	4	6	8	12	16
AOS	ASTM D4751	US Sieve	1/150,000 ft ²	70	70	100	100	100
Permitivity	ASTM D4491	gal/min/ft ²	1/150,000 ft ²	140	90	80	70	50
Puncture Strength	ASTM D4833	lbs	1/150,000 ft ²	60	90	130	195	245
Mullen Burst Strength	ASTM D3786	lbs/in ²	1/150,000 ft ²	225	350	400	650	800
Trapezoidal Tear Strength	ASTM D4533	lbs	1/150,000 ft ²	35	65	80	115	145
Grab Tensile/Elongation	ASTM D4632	lbs(%)	1/150,000 ft ²	95 (50)	150 (50)	200 (50)	300 (50)	400 (50)

Data Sheet DS2 - Woven Geotextile Mechanical Properties							
Property	Test Method	Units	Testing Frequency	Value			
				Group 1	Group 2	Group 3	Group 4
Puncture Strength	ASTM D4833	lbs	1/150,000 ft ²	60	90	120	135
Mullen Burst Strength	ASTM D3786	lbs/in ²	1/150,000 ft ²	300	400	600	480
Trapezoidal Tear Strength	ASTM D4533	lbs	1/150,000 ft ²	45	75	115	95/55
Grab Tensile/Elongation	ASTM D4632	lbs(%)	1/150,000 ft ²	120 (15)	200 (15)	300 (15)	350/250 (15)

Data Sheet DS 3 - Uniaxial Geogrid Mechanical Properties							
Property	Test Method	Units	Testing Frequency	Value			
				Group 1	Group 2	Group 3	Group 4
Tensile Strength 2% Strain	GRI GG1-87	lbs/ft	1/150,000 ft ²	1,000	1,900	2,600	3,000
Tensile Strength 5% Strain	GRI GG1-87	lbs/ft	1/150,000 ft ²	1,750	3,500	4,500	5,500
Ultimate Tensile Strength	GRI GG1-87	lbs/ft	1/150,000 ft ²	4,000	6,500	9,000	10,500
Flexural Rigidity	ASTM D1388 ^{*1}	mg-cm	1/150,000 ft ²	725,000	5,000,000	6,500,000	9,000,000
Creep Limited Strength @ 10% Strain	ASTM D5262	lbs/ft	1/150,000 ft ²	1,800	2,800	3,700	4,600
Creep Limited Strength @ 5% Strain	ASTM D5262	lbs/ft	1/150,000 ft ²	1,100	1,750	2,250	2,750
Tensile Modulus (MD)	GRI GG3-87 ^{*2}	lbs/ft	1/150,000 ft ²	50,000	95,000	130,000	150,000
Polypropylene Content	ASTM D1248 Type III Class A Grade 5	%	1/150,000 ft ²	97	97	97	97
Carbon Black Content	ASTM D4218	%	1/150,000 ft ²	2	2	2	2

*1 - Modified to account for wide specimen testing

*2 - Secant modulus at 2% elongation with no offset allowances

Data Sheet DS4 - Biaxial Geogrid Mechanical Properties								
Property	Test Method	Units	Testing Frequency	Value				
				Group 1A	Group 1B	Group 2A	Group 2B	Group 3
Tensile Strength @ 2% Strain (MD)	GRI GG1-87	lbs/ft	1/150,000 ft ²	300	300	350	350	650
Tensile Strength @ 2% Strain (XMD)	GRI GG1-87	lbs/ft	1/150,000 ft ²	425	425	575	575	900
Tensile Strength @ 5% Strain (MD)	GRI GG1-87	lbs/ft	1/150,000 ft ²	600	600	800	800	1,100
Tensile Strength @ 5% Strain (XMD)	GRI GG1-87	lbs/ft	1/150,000 ft ²	850	850	1,300	1,300	1,500
Ultimate Tensile Strength (MD)	GRI GG1-87	lbs/ft	1/150,000 ft ²	900	900	1,250	1,250	2,000
Ultimate Tensile Strength (XMD)	GRI GG1-87	lbs/ft	1/150,000 ft ²	1,400	1,400	2,100	2,100	2,800
Flexural Rigidity	ASTM D1388 ^{*1}	mg-cm	1/150,000 ft ²	250,000	250,000	750,000	750,000	3,000,000
Tensile Modulus	GRI GG1-87 ^{*2}	lbs/ft	1/150,000 ft ²	14,000	14,000	18,500	18,500	33,000
Polypropylene Content	ASTM 1248 Type III Class A Grade 5	%	1/150,000 ft ²	98	97	98	97	97
Carbon Black Content	ASTM D4218	%	1/150,000 ft ²	0.5	2	0.5	2	2

*1 - Modified to account for wide specimen testing

*2 - Secant modulus at 2% elongation with no offset allowances

SECTION 02200**SITE PREPARATION****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes
 - 1. Clearing and grubbing
 - 2. Grading
 - 3. Stripping and stockpiling of soil and sod

1.2 SUBMITTALS

- A. Submit construction methods and equipment that will be utilized for the clearing, grubbing, and waste material disposal specified within this Section.

PART 2 PRODUCTS – NOT USED**PART 3 EXECUTION****3.1 CLEARING AND GRUBBING**

- A. Except as otherwise directed, cut, grub, remove and dispose of all trees, stumps, brush, shrubs, roots and any other objectionable material within the limits of the Work on the site and where required to construct the work.
- B. Protect trees or groups of trees, designated by the Engineer to remain, from damage by all construction operations by erecting suitable barriers, or by other approved means. Conduct clearing operations to prevent falling trees from damaging trees designated to remain.
 - 1. All damage done to the trees by the Contractor's operation shall be trimmed and painted where cut as directed or as necessary to provide adequate vertical clearance for construction activities. The dressing or paint shall be applied no later than two days after the cuts are made.
 - 2. Use all necessary precautions to prevent injury to other desirable growth in all areas. Contractor shall assume full responsibility for any damage.
- C. Protect areas outside the limits of clearing from damage. No equipment or materials shall be stored in these areas.
- D. No stumps, trees, limbs, or brush shall be buried in fills or embankments.

3.2 DISPOSAL OF MATERIALS

- A. Remove all tree trunks, limbs, roots, stumps, brush, foliage, other vegetation and objectionable material from the site and dispose of in a legal manner.
- B. Burning or direct burial of cleared and grubbed materials on-site will not be permitted.

3.3 GRADING

- A. In preparation for placing loam, paved drives and appurtenances, perform grading to the lines, grades and elevations shown on the Drawings, and otherwise directed by the Engineer and perform in such a manner that the requirements for formation of embankments can be followed. All material encountered, regardless of its nature, within the limits indicated, shall be removed and disposed of as directed. During the process of grading, maintain the subgrade in such condition that it will be well drained at all times. Install temporary drains and drainage ditches to intercept or divert surface water that may affect the work when necessary.
- B. If at the time of grading it is not possible to place material in its final location, stockpile material in approved areas for later use. No extra payment will be made for the stockpiling or double handling of excavated material.
- C. The right is reserved to make minor adjustments or revisions in lines or grades if found necessary as the work progresses.
- D. Stones or rock fragments larger than 4 inches in their greatest dimensions will not be permitted in the top 12 inches of the finished subgrade of all fills or embankments except along the access roadways and rip-rap where shown on the Drawings.
- E. In cuts, loose or protruding rocks on the excavated slopes shall be barred loose or otherwise removed to line or finished grade of slope. Cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings or as directed by the Engineer.

3.4 DUTCH ELM WOOD

- A. Dutch Elm diseased wood shall be disposed of in accordance with any local regulations.
- B. Where the work includes the removal of elm trees or the limbs of elm trees, such trees or limbs thereof shall be disposed of immediately after cutting or removal and in such a manner as to prevent the spread of Dutch Elm disease. This shall be accomplished by covering them with earth to a depth of at least 6 inches in areas outside the right-of-way locations where the Contractor has arranged for disposal.
- C. Where the work includes the removal and disposal of stumps of elm trees, such stumps shall be completely disposed of immediately after cutting in the manner specified above.

END OF SECTION

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SECTION 02210**SUBSURFACE INVESTIGATIONS****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Soils subsurface investigation at the site, the use of data resulting from the investigation, and conditions warranting additional soils investigation.
2. Pipe and utility subsurface investigations that are required in order to properly locate, plan for and/or connect to the various existing utilities.

B. Related Sections

1. Section 02315 - Excavation, Backfill, Compaction, and Dewatering
2. Section 02740 - Bituminous Concrete Pavement

1.2 REFERENCES

- A. 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.560 through 1926.562 including Appendices A through F
- B. MGL Chapter 82 Section 40

1.3 QUALITY ASSURANCE

- A. The entire test pit excavation must be observed by the Engineer.

1.4 SITE CONDITIONS**A. Soils Investigation**

1. Exploration locations are shown on the Drawings.
2. Use of the Data
 - a. The Drawings indicate conditions as they are believed to exist based upon limited subsurface explorations. Investigations and field tests must be conducted to verify the conditions that exist which may affect the Work. All investigations must be conducted under the Engineer's observation.

B. Pipeline and Utility Investigations

1. The Drawings show available data relative to existing underground pipe and utilities.

PART 2 PRODUCTS - NOT USED**PART 3 EXECUTION****3.1 PREPARATION**

- A. Obtain all available information on buried structures and utilities in the vicinity of the investigation.

- B. Coordinate Work such that all affected property, structure, and utility owners are aware of the Work prior to its commencement.
- C. Schedule subsurface investigations such that they do not interfere with other Work or traffic and in advance of other Work in that location.
- D. Provide the Engineer with 24-hour notice prior to commencement of subsurface investigations.

3.2 SUBSURFACE INVESTIGATIONS

- A. Prior to test pitting operations, delineate the general scope of the excavation or boring on the paved surface of the ground using white paint, or stakes or other suitable white markings on non-paved surfaces and coordinate with the appropriate agencies in accordance MGL Chapter 82 Section 40. Pre-marking will not be acceptable if such marks can interfere with traffic or pedestrian control or are misleading to the general public. Pre-marking will not be required of any continuous excavation that is over 500 feet in length
- B. Excavate test pits as indicated, or as requested by the Owner. Expose the top of the pipeline, and adjacent utilities, at each test pit location.
- C. Contactor may, at his expense and with permission by the Owner, perform additional explorations not ordered by the Engineer.
- D. Perform test pits in accordance with the requirements of Section 02315. Excavate the bottom 2 feet of the test pit (or in close proximity to known or anticipated utilities) by hand. Excavate to top of pipelines by hand. Test pits shall be braced, sheeted and dewatered or as otherwise required for safe excavation and examination of the structure or utility to be exposed.
- E. Measure the depth to the top of the pipeline, as well as to adjacent utilities, from the ground surface, at each test pit location. Record location, depth and size of pipelines and utilities uncovered during the test pits. Record any other pertinent information which is learned as a result of excavating the test pit.
- F. Excavate test pits of an appropriate size with equipment suitable for the location and character of the pit to be excavated.
- G. All subsurface investigations shall be conducted in accordance 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.650 through 1926.652 including Appendices A through F.
- H. After observation by the Engineer, backfill and compact the test pits in accordance with Section 02315.
- I. Borings or other drilled probes shall be filled in their entirety with grout upon completion.
- J. Repair damage to any structure, utility, or private or public property or Site feature damaged during the Work to the satisfaction of the Engineer.
- K. Repair paved surfaces in accordance with Section 02740.
- L. Repair lawn areas or grass surfaces in accordance with 02920.

END OF SECTION

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SECTION 02225**SELECTIVE DEMOLITION****PART 1 GENERAL****1.1 SUMMARY**

- A. Selective demolition including but not limited to pavements, walls, and curbing. Refer to Drawings for selective demolition scope and limits.
- B. Removal and lawful disposal of miscellaneous debris and solid waste located within the Limit of Work.

1.2 RELATED SECTIONS

- A. Section 01350 – Health & Safety Plan

1.3 DEFINITIONS

- A. Demolish – To tear down, segregate waste streams and lawfully recycle or dispose of all debris generated in the process including structure contents.
- B. Limit of Work – Area delineated on Drawings that defines the extent of demolition work under the Contract.
- C. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- D. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- E. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- F. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- G. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 SUBMITTALS

- A. Quality Control Submittals prior to commencement of on-site demolition:
 - 1. Methods of demolition and equipment proposed for selective demolition. This submittal should be sufficient to demonstrate a thorough understanding of the Work to be completed and the means that will be implemented to safely complete the Work within the Contract Time without damage to surrounding structures or resources. The Engineer will review the submittal for completeness, but will not “Approve” the means and methods.
 - 2. Waste Management Plan to indicate the types of wastes to be generated and the proposed disposal or recycling locations.

3. Copies of any authorizations and permits required to perform the work, including disposal/recycling facility permits and building permits.
- B. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01320 "Construction Photographs." Submit before Work begins.

1.5 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.6 REGULATORY REQUIREMENTS

- A. Contractor is solely responsible for obtaining permits or approvals which may be required to perform the work of this section, including all costs, fees and taxes required or levied.
- B. Comply with all applicable federal, state, and local environmental, safety and health requirements regarding the renovation or demolition of structures and other site features and recycling or disposal of demolition debris, as applicable.

1.7 JOB CONDITIONS – SELECTIVE DEMOLITION

- A. Conduct selective demolition work in a manner that will minimize need for disruption of owner's normal operations. Provide minimum of two (2) weeks advance notice to owner of demolition activities which will impact owner's normal operations.
- B. The Owner assumes no responsibility for actual condition of items or structures to be demolished. However, variations within the structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- C. Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.
 1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of the facility.
 2. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.
 3. Protect from damage existing finish work that is to remain in place which will become exposed during demolition operations.
 4. Remove protections at completion of work.
- D. Promptly repair damages caused to adjacent facilities by demolition work at no additional cost to the Owner.

- E. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
- F. Do not close, block or otherwise obstruct roadways, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- G. Maintain existing utilities, keep in service, and protect against damage during demolition operations.
- H. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

PART 2 PRODUCTS

2.1 GENERAL

- A. Warning Signs and Labels - Work areas shall be properly demarcated in accordance with OSHA requirements. The contractor's specific containment approaches may also include the following products:
 - 1. Plastic Sheeting ("Poly") - shall polyethylene or equivalent with two layers with a thickness of at least 6 mil for all applications.
- B. All materials or equipment delivered to the site shall be unloaded, temporarily stored, and transferred to the work area in a manner that shall not interfere with operation of others at the facility, or employee's access and safety.
- C. Damaged or deteriorated materials shall not be used and shall be promptly removed from the premises.

2.2 SAFETY SUPPLIES AND EQUIPMENT

- A. Contractor shall comply with Section 01350 and is fully responsible for the implementation and monitoring of all health and safety measures.
- B. Respirator Types: As applicable, provide workers with a full or half facepiece respirator that is approved by NIOSH/MSHA for protection against airborne dust and other hazards that may be present, and meets the requirements of the OSHA standard.
- C. Protective Clothing: As applicable, provide workers and approved visitors with disposable coveralls, head and foot coverings, gloves and eye protection (i.e. safety glasses) and half-face respiratory protection including HEPA cartridges.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations. Perform lock-out/tag-out procedures as necessary.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
 - 1. Unknown Site Conditions - The information provided on the Drawings and in the Specifications is believed accurate. Field verify all information. Bear full responsibility for obtaining all locations of underground structures, utilities and their connections. Maintain services to buildings outside the limits of work, at no additional cost to the Owner.
- C. Verify that hazardous materials have been remediated before proceeding with selected demolition operations.
- D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 SITE PREPARATION

- A. Remove and/or stabilize all overhead hazards, prior to commencing work near any building. Where hazards cannot be stabilized, mark and control areas below hazards to prohibit access below the hazards. Similarly, all holes through the floors or weak sections of the floor shall either be covered or clearly marked to prohibit entry. If necessary, floor coverings shall be capable of supporting heavy equipment use.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Cover and protect furniture, furnishings, and equipment that have not been removed.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of structures and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being selectively demolished.

1. Strengthen or add new supports when required during progress of selective demolition.
2. Cease operations and notify the Owner and the Engineer immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
3. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Perform selective demolition work in a systematic manner. Provide scaffolding as necessary. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
2. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
3. Contact local fire department with respect to flame -cutting operations and maintain fire watch as directed by the local fire department.
4. Maintain adequate ventilation when using cutting torches.
5. Repair selective demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work.
6. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- D. Existing Items to Remain: Protect construction indicated to remain against damage during selective demolition..

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

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SECTION 02315**EXCAVATION, BACKFILL, COMPACTION AND DEWATERING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Excavation, backfill and compaction for subsurface utilities
 - 2. Temporary dewatering systems
- B. Related Sections
 - 1. Section 01570 - Temporary Controls
 - 2. Section 02320 - Borrow Materials

1.2 REFERENCES

- A. ASTM D1557-07 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))
- B. ASTM D1556-07 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
- C. ASTM D2487-06e1 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D. ASTM D6938-08a - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- E. 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.650 through 1926.652 including Appendices A through F
- F. 520 CMR 14.00 Excavation and Trench Safety
- G. 780 CMR 1705.0 Requirements for Structural Tests and Inspections
- H. Commonwealth of Massachusetts Highway Department "Standard Specifications for Highways and Bridges," 1988 Edition as amended

1.3 DEFINITIONS

- A. Benching - A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
- B. Earth Retention Systems - Any structural system, such as sheeting and bracing or cofferdams, designed to retain in-situ soils in place and prevent the collapse of the sides of an excavation in order to protect employees and adjacent structures.
- C. Excavation - Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

- D. Protective System - A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include earth retention systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.
- E. Registered Professional Engineer - A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.
- F. Shield System - A structure that is designed to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built in accordance with 29 CFR 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."
- G. Sloping - A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.
- H. Temporary Dewatering System - A system to lower and control water to maintain stable, undisturbed subgrades at the lowest excavation levels. Dewatering shall be provided for all pipelines, structures and for all other miscellaneous excavations.
- I. Trench - A narrow excavation (in relation to its length) made below the surface of the ground, of at least three feet in depth. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m).

1.4 SUBMITTALS

- A. Drawings and calculations for each Earth Retention System required in the Work. The submittal shall be in sufficient detail to disclose the method of operation for each of the various stages of construction required for the completion of the Earth Retention Systems.
 - 1. Submit calculations and drawings for Earth Retention Systems prepared, signed and stamped by a Professional Engineer registered in the state where the work is performed.
- B. Performance data for the compaction equipment to be utilized
- C. Construction methods that will be utilized for the removal of rock
- D. Modified Proctor Test (ASTM D1557) results and soil classification (ASTM D2487) for all proposed backfill materials at the frequency specified below:
 - 1. For suitable soil materials removed during Excavation, perform one test for every 1,000 cubic yards of similar soil type. Similarity of soil types will be as determined by the Engineer.

2. For borrow materials; perform tests at frequency specified in Section 02320, Borrow Materials.
- E. Compaction test results (i.e. ASTM D6938 or ASTM D1556) at a frequency of one test for every 100 cubic yards of material backfilled or at a minimum of one test per lift. The Engineer will determine the locations and lifts to be tested. The Contractor shall plan his operations to allow adequate time for laboratory tests and to permit taking of field density tests during compaction.
1. Methods and equipment proposed for compaction shall be subject to prior review by the Engineer. Compaction generally shall be done with vibrating equipment. Static rolling without vibration may be required by the Engineer on sensitive soils that become unstable under vibration. Displacement of, or damage to existing utilities or structure shall be avoided. Any utility or structure damaged thereby shall be replaced or repaired as directed by the Engineer.
 2. Additional compaction testing may be required when there is evidence of a change in the quality of moisture control or the effectiveness of compaction.
 - a. Any costs associated with correcting and retesting as a result of a failure to meet compaction requirements shall be borne by the Contractor.
 3. If all compaction test results within the initial 25% of the total anticipated number of tests indicate compacted field densities equal to or greater than the project requirements, the Engineer may reduce frequency of compaction testing. In no case will the frequency be reduced to less than one test for every 500 cubic yards of material backfilled.
 4. The Contractor is cautioned that compaction testing by nuclear methods may not be effective where trenches are so narrow that trench walls impact the attenuation of the gamma radiation, when adjacent to concrete that impacts the accuracy of determining moisture content, or where oversize particles (i.e. large cobbles or coarse gravels) are present. In these cases, other field density testing methods may be required.

1.5 QUALITY ASSURANCE

- A. All Excavation, Trenching, and related Earth Retention Systems shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926 Subpart P), 520 CMR 14.00, and other State and local requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.
1. Compaction test results (i.e. ASTM D6938 or ASTM D1556) at a frequency of one test for every 100 cubic yards of material backfilled. The Engineer will determine the locations and lifts to be tested.
 - a. The Engineer may specify additional compaction testing when there is evidence of a change in the quality of moisture control or the effectiveness of compaction.
 - b. If all compaction test results within the initial 25% of the total anticipated number of tests indicate compacted field densities equal to or greater than 95% of maximum dry density at optimum moisture content, the Engineer

may reduce frequency of compaction testing. In no case will the frequency be reduced to less than one test for every 500 cubic yards of material backfilled.

- c. The Contractor is cautioned that compaction testing by nuclear methods may not be effective where excavation sidewalls impact the attenuation of the gamma radiation or where oversize particles (i.e. large cobbles or coarse gravels) are present. In these cases, other field density testing methods may be required.
- B. Employ the services of a dewatering specialist or firm when well points, deep wells, recharge systems, or equal systems are required. Specialist shall have completed at least 5 successful dewatering projects of equal size and complexity and with equal systems.

1.6 PROJECT CONDITIONS

- A. Notify Dig Safe and obtain Dig Safe identification numbers.
- B. Notify utility owners in reasonable advance of the work and request the utility owner to stake out on the ground surface the underground facilities and structures. Notify the Engineer in writing of any refusal or failure to stake out such underground utilities after reasonable notice.
- C. Make explorations and Excavations to determine the location of existing underground structures, pipes, house connection services, and other underground facilities in accordance with Paragraph 3.2.D of this Section.
- D. In accordance with 520 CMR 14.00, no person shall, except in an emergency, make an excavation in any public way, public property, or privately owned land until a permit is obtained from the appropriate designated permitting authority. For this project, the permit should be obtained from the City of Gardner.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

- A. Fill material is subject to the approval of the Engineer and may be either material removed from excavations or borrow from off site. Fill material, whether from the excavations or from borrow, shall be of such nature that after it has been placed and properly compacted, it will make a dense, stable fill.
- B. Satisfactory fill materials shall include materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, SW, and SP. Additional requirements are included in Section 02320.
- C. Satisfactory fill materials shall not contain trash, refuse, vegetation, masses of roots, individual roots more than 18 inches long or more than 1/2 inch in diameter, or stones over 6 inches in diameter. Unless otherwise stated in the Contract Documents, organic matter shall not exceed minor quantities and shall be well distributed.
- D. Satisfactory fill materials shall not contain frozen materials nor shall backfill be placed on frozen material.

- E. Excavated surface and/or pavement materials such as gravel or trap rock that are salvaged may be used as a sub-grade material, if processed to the required gradation and compacted to the required degree of compaction. In no case shall salvaged materials be substituted for the required gravel base.

2.2 DEWATERING MATERIALS

- A. Provide silt filter bags (Dandy Dewatering Bag, Dirtbag, JMP Environ-Protection Filter Bag, or equal) of adequate size to match flow rate.
- B. Provide dewatering equipment and materials for engineered dewatering systems.

PART 3 EXECUTION

3.1 PREPARATION

- A. Public Safety and Convenience
 - 1. Adhere to the requirements of 520 CMR 14.00 for all excavation work.
 - 2. Take precautions for preventing injuries to persons or damage to property in or about the Work.
 - 3. Provide safe access for the Owner and Engineer at site during construction.
 - 4. Do not obstruct site drainage, natural watercourses or other provisions made for drainage.

3.2 CONSTRUCTION

- A. Earth Retention Systems
 - 1. Provide Earth Retention Systems necessary for safety of personnel and protection of the Work, adjacent work, utilities and structures.
 - 2. Maintain Earth Retention Systems for the duration of the Work.
 - 3. Sheeting
 - a. Systems shall be constructed using interlocking corner pieces at the four corners. Running sheet piles by at the corners, in lieu of fabricated corner pieces, will not be allowed.
 - b. Drive sheeting ahead of and below the advancing excavation to avoid loss of materials from below and from in front of the sheeting.
 - c. Sheeting is to be driven to at least the depth specified by the designer of the earth retention system, but no less than 2 feet below the bottom of the Excavation.
 - 4. Remove earth retention system, unless designated to be left in place, in a manner that will not endanger the construction or other structures. Backfill and properly compact all voids left or caused by the withdrawal of sheeting.
 - a. Remove earth retention systems, which have been designated by the Engineer to be left in place, to a depth of 3 feet below the established grade.

B. Excavation

1. Perform excavation to the lines and grades indicated on the Drawings. Backfill unauthorized over-excavation in accordance with the provisions of this Section.
2. Excavate with equipment selected to minimize damage to existing utilities or other facilities. Hand excavate as necessary to locate utilities or avoid damage.
3. Sawcut the existing pavement in the vicinity of the excavation prior to the start of excavation in paved areas, so as to prevent damage to the paving outside the requirements of construction.
4. Perform excavation in such a manner as to prevent disturbance of the final subgrade. The Engineer or Owner may require the final six inches of excavation be performed by hand, with the use of a smooth-faced bucket, or other means acceptable to the Engineer or Owner, at no additional cost if subgrade disturbance is considered excessive as judged by the Engineer or Owner.
5. During excavation, material satisfactory for backfill shall be stockpiled in an orderly manner at a distance from the sides of the excavation equal to at least one half the depth of the excavation, but in no case closer than 2 feet.
 - a. Excavated material not required or not suitable for backfill shall be removed from the site.
 - b. Perform grading to prevent surface water from flowing into the excavation.
 - c. Pile excavated material in a manner that will endanger neither the safety of personnel in the excavation nor the Work itself. Avoid obstructing sidewalks and driveways.
 - d. Hydrants under pressure, valve pit covers, valve boxes, manholes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the Work is completed.
6. Grade or create berms or swales to direct surface water from excavations to appropriate structures designed to accommodate storm water. If no structures exist, direct water to areas that minimize impacts to adjacent structures and properties.
7. Make pipe trenches as narrow as practicable and keep the sides of the trenches undisturbed until backfilling has been completed. Provide a clear distance of 12 inches on each side of the pipe.
8. Perform the excavation in such a manner as to prevent disturbance of the final subgrade. If excessive subgrade disturbance is occurring, as judged by the Owner or Engineer, then the final 6 inches of the excavation shall be performed by hand, with the use of a smooth-faced bucket, or other means acceptable to the Engineer or Owner.
 - a. Grade the excavation bottom to provide uniform bearing and support for the bottom quadrant of each section of pipe.

- b. Excavate bell holes at each joint to prevent point bearing.
 - c. Remove stones greater than 6 inches in any dimension from the bottom of the trench to prevent point bearing.
9. If satisfactory materials are not encountered at the design subgrade level, excavate unsatisfactory materials to the depth directed by the Engineer and properly dispose of the material. Backfill the resulting extra depth of excavation with satisfactory fill materials and compact in accordance with the provisions of this Section.

C. Backfill and Compaction

- 1. Unless otherwise specified or indicated on the Drawings, use satisfactory material removed during excavation for backfilling trenches. The Engineer may require stockpiling, drying, blending and reuse of materials from sources on the Project.
- 2. Spread and compact the material promptly after it has been deposited. When, in the Engineer's judgment, equipment is inadequate to spread and compact the material properly, reduce the rate of placing of the fill or employ additional equipment.
- 3. Prior to backfilling or placement of structures, excavated subgrades shall be proof compacted with either 10 passes of a 10-ton vibratory drum roller for open excavations or 6 passes of a large, reversible, walk behind vibratory compactor capable of exerting a minimum force of 2,000 pounds in trench or pit excavations. Soft or weak spots shall be over-excavated and replaced with compacted Granular Fill or compacted Crushed Stone wrapped in a non-woven geotextile, as directed by the Owner or their representative. If proof compaction will prove detrimental to the subgrade due to the presence of groundwater, static rolling may be allowed at the discretion of the Engineer or Owner.
- 4. Soil bearing surfaces shall be protected against freezing and the elements before and after concrete placement. If construction is performed during freezing weather, structures shall be backfilled as soon as possible after they are constructed. Insulating blankets or other means shall be used for protection against freezing at the discretion of the Engineer or Owner.
- 5. When excavated material is specified for backfill and there is an insufficient amount of this material at a particular location on the Project due to rejection of a portion thereof, consideration will be given to the use of excess material from one portion of the Project to make up the deficiency existing on other portions of the Project.
 - a. Use borrow material if there is no excess of excavated material available at other portions of the Project.
- 6. Backfilling and compaction methods shall attain 95% of maximum dry density at optimum moisture content as determined in accordance with ASTM D1557.
- 7. Do not place stone or rock fragment larger than six inches in greatest dimension in the backfill.

8. Maximum loose lift height for backfilling existing or borrow material shall be 12 inches, unless satisfactory compaction is demonstrated otherwise to the Engineer through field-testing. In no case shall loose lift height for backfilling exceed 3 feet.
9. Do not drop large masses of backfill material into the trench endangering the pipe or adjacent utilities.
10. Install pipe in rock excavated trenches on a dense graded stone bedding with a minimum depth of 6 inches. Shape the stone bedding at the pipe bells to provide uniform support. Encase the pipe in the dense graded crushed stone bedding to a grade 6 inches over the top of the pipe and 12 inches on each side of the pipe.
11. Backfill from the bottom of the trench to the centerline of the pipe with the specified material. This initial backfill is to be placed in layers of no more than 6 inches and thoroughly tamped under and around the pipe. This initial backfilling shall be deposited in the trench for its full width on both sides of the pipe, fittings and appurtenances simultaneously.
12. Electrical conduit not encased in concrete, shall be backfilled with sand borrow conforming to the requirements of Section 02320. The backfill shall be placed in the trench for its full width and shall extend to 12 inches over the conduit.
13. Where excavation is made through permanent pavements, curbs, paved driveways, or paved sidewalks, or where such structures are undercut by the excavation, place the entire backfill to sub-grade with granular materials and compact in 6 inch layers. Use approved mechanical tampers for the full depth of the trench. If required, sprinkle the backfill material with water before tamping so as to improve compaction. Any trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required to correct the problem, and shall then be refilled and properly compacted with the surface restored to required grade at no additional expense.
14. The Contractor shall not place backfill against or on structures until they have attained sufficient strengths to support the loads to which they will be subjected, without distortion, cracking, or other damage. As soon as possible after the structures are adequate, they shall be backfilled with suitable backfill material.
15. Place and compact backfill around manholes, vaults, pumping stations, gate boxes or other structures in six inch layers, from a point one foot over the pipe. Exercise care to protect and prevent damage to the structures.

D. Test Pit Excavation

1. General requirements of test pits are specified in Section 02210.

E. Dewatering

1. Obtain the following construction dewatering permits, as required:
 - a. US EPA Dewatering General Permit
2. Provide, operate and maintain adequate pumping, diversion and drainage facilities in accordance with the approved dewatering plan to maintain the

excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural ground. Locate dewatering system components so that they do not interfere with construction under this or other contracts.

3. Conduct operations so as to prevent at all times the accumulation of water, ice and snow in excavations or in the vicinity of excavated areas so as to prevent water from interfering with the progress or quality of the work.
4. Take actions necessary to ensure that dewatering discharges comply with permits applicable to the Project. Dispose of water from the trenches and excavations in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.
5. Repair any damage resulting from the failure of the dewatering operations and any damage resulting from the failure to maintain all the areas of work in a suitable dry condition.
6. Exercise care to ensure that water does not collect in the bell or collar holes to sufficient depth to wet the bell or collar of pipes waiting to be jointed.
7. Take precautions to protect new work from flooding during storms or from other causes. Control the grading in the areas surrounding all excavations so that the surface of the ground will be properly sloped to prevent water from running into the excavated area. Where required, provide temporary ditches for drainage. Upon completion of the work, all areas shall be restored to original condition.
8. Brace or otherwise protect pipelines and structures not stable against uplift during construction.
9. Do not excavate until the dewatering system is operational and the excavation may proceed without disturbance to the final subgrade.
10. Unless otherwise specified, continue dewatering uninterrupted until the structures, pipes, and appurtenances to be installed have been completed such that they will not float or be otherwise damaged by an increase in groundwater elevation.
11. Temporarily lower the groundwater level at least two feet below excavations to limit potential "boils," loss of fines, or softening of the ground. If any of these conditions are observed, submit a modified dewatering plan to the Engineer within 48 hours. Implement the approved modified plan and repair any damage incurred.
12. When subgrades are soft, weak, or unstable due to improper dewatering techniques, remove and replace the materials in accordance with Section 02320 at no cost to the Owner.
13. Notify the Engineer immediately if any settlement or movement is detected of survey points adjacent to excavations being dewatered. If settlement is deemed by the Engineer to be related to the dewatering, submit a modified dewatering plan to the Engineer within 24 hours. Implement the approved modified plan

and repair any damage incurred to the adjacent structure at no cost to the Owner.

14. Dewatering discharge:
 - a. Install sand and gravel, or crushed stone, filters in conjunction with sumps, well points, and/or deep wells to prevent the migration of fines from the existing soil during the dewatering operation.
 - b. Transport pumped or drained water without interference to other work, damage to pavement, other surfaces, or property. Pump water through a silt filter bag or other approved sedimentation device prior to discharge to grade of drainage system.
 - c. Do not discharge water into any sanitary sewer system.
 - d. Provide separately controllable pumping lines.
 - e. The Engineer reserves the right to sample discharge water at any time.
15. Install erosion/sedimentation controls for velocity dissipation at point discharges onto non-paved surfaces.
16. Removal
 - a. Do not remove dewatering system without written approval from the Engineer.
 - b. Backfill and compact sumps or ditches with screened gravel or crushed stone in accordance with Section 02320.
 - c. Remove well points and deep wells. Backfill abandoned well holes with cement grout having a water cement ratio of 1 to 1 by volume.

3.3 PROTECTION

A. Protection of Existing Structures

1. All existing foundations, conduits, wall, pipes, wires, poles, fences, property line markers and other items which the Engineer decides must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from damage by the Contractor. Should such items be damaged, they shall be restored by the Contractor to at least as good condition as that in which they were found immediately before the Work began.

B. Accommodation of Traffic

1. Streets and drives shall not be unnecessarily obstructed. The Contractor shall take such measures at his own expense to keep the street or road open and safe for two-way traffic unless otherwise indicated.
2. Construct and maintain such adequate and proper bridges over excavations as may be necessary or as directed for the safe accommodation of pedestrians and vehicles. Provide substantial barricades at crossings of trenches, or along the trench to protect the traveling public.

3. Where deemed necessary, such additional passageways as may be directed shall be maintained free of such obstructions. All material piles, open excavations, equipment, and pipe which may serve as obstructions to traffic shall be protected by proper lights, signage, or guards as necessary.
4. All traffic controls shall be in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition.

C. Erosion and Sedimentation Control

1. Take all necessary steps to prevent soil erosion.
2. Plan the sequence of construction so that only the smallest practical area of land is exposed at any one time during construction.
3. Temporary vegetation and/or mulching shall be used to protect critical areas exposed during construction as judged by the Engineer.

END OF SECTION

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SECTION 02317

UNDERGROUND WARNING TAPE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Underground Warning Tape

1.2 SUBMITTALS

- A. Shop Drawing Submittals
 - 1. Product Data

PART 2 PRODUCTS

2.1 MATERIALS

- A. Metallic warning tape for underground piping shall be polyethylene tape with metallic core for easy detection and location of piping with a metal detector.
- B. Tape shall be 6 inches wide.
- C. Tape shall be as manufactured by Seton Name Plate Corp., New Haven, CT; Presco Detectable Underground Warning tape, Sherman, Texas; Blackburn Manufacturing, Neligh, NE; Mercotape, Hachensach, NJ; or equal.
- D. The warning tape shall be heavy gauge 0.004 inch polyethylene and shall be resistant to acids, alkalis and other soil components. It shall be highly visible in the following colors with the associated phrases stamped in black letters and repeated at a maximum interval of 40 inches.

Type of Utility	Color	Warning Message
Sanitary Sewer	Green	CAUTION - SANITARY SEWER BURIED BELOW
Storm Drain	Green	CAUTION - STORM DRAIN BURIED BELOW
Water	Blue	CAUTION - WATER LINE BURIED BELOW
Electric	Red	CAUTION - ELECTRIC LINE BURIED BELOW
Telephone / Communications	Orange	CAUTION - TELEPHONE LINE BURIED BELOW
Gas	Yellow	CAUTION - GAS LINE BURIED BELOW

- E. The tape shall be of the type specifically manufactured for marking and locating utilities.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All buried pipe and fittings shall be installed with metallic-lined underground warning tape located no more than 24 inches below final grade to allow detection by a metal detector.

END OF SECTION

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SECTION 02320

BORROW MATERIALS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Gravel Borrow
 - 2. Processed Gravel Borrow for Pavement Sub-base
 - 3. Granular Fill
 - 4. Sand Borrow
 - 5. Ordinary Borrow
- B. Related Sections
 - 1. Section 02315 – Excavation, Backfill, Compaction and Dewatering

1.2 REFERENCES

- A. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- B. ASTM C117 - Standard Test Method for Materials Finer than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing
- C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
- D. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb./ft³)
- E. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head)
- F. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- G. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- H. AASHTO – Standard Specification for Transportation Materials and Methods of Sampling and Testing, 1986 Edition as amended
- I. Commonwealth of Massachusetts Highway Department “Standard Specification for Highways and Bridges,” 1988 Edition as amended

1.3 SUBMITTALS

- A. Representative Samples of borrow materials taken from the source. Tag, label, and package the Samples as requested by Engineer. Provide access to the borrow site for field evaluation and inspection.

- B. Provide sieve analysis (ASTM C136) and permeability analysis (ASTM D2434) from certified soils testing laboratory for all borrow materials. Take and test a sample, at no additional cost to the Owner for each 1,500 c.y. of borrow material placed.
- C. Provide modified proctor analysis (ASTM D1557) from certified soils testing laboratory for all borrow materials.
 - 1. Take and test a sample of low permeability soil for each 5,000 cy of material placed, or as directed by the Engineer.
 - 2. All other borrow materials shall be tested once unless more frequent testing is deemed necessary by the Engineer or Owner due to material variation.
- D. The Engineer reserves the right to require more frequent testing than that which is specified above should the borrow characteristics change.

1.4 QUALITY ASSURANCE

- A. No borrow shall be placed prior to the approval of Samples by the Engineer.

1.5 PROJECT/SITE CONDITIONS

- A. Existing Conditions
 - 1. Comply with any environmental requirements and restrictions.
 - 2. Keep all public and private roadway surfaces clean during hauling operations and promptly and thoroughly remove any borrow or other debris that may be brought upon the surface before it becomes compacted by traffic. Frequently clean and keep clean the wheels of all vehicles used for hauling to avoid bringing any dirt upon the paved surfaces.

PART 2 PRODUCTS

2.1 GRAVEL BORROW

- A. Gravel Borrow shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings, and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.

Gradation requirements for Gravel Borrow shall be determined by AASHTO-T11 and T27 and shall conform to the following:

Sieve	Percent Passing
½ inch	50 – 85
No. 4	40 – 75
No. 50	8 – 28
No. 200	0 - 10

Maximum size of stone in Gravel Borrow shall be 2 inches.

2.2 PROCESSED GRAVEL BORROW FOR PAVEMENT SUBBASE

- A. The compacted Processed Gravel Borrow to be used for gravel access roads and pavement subbase, or other area where a firm, free-draining subgrade is needed shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.

- B. Gradation requirements shall conform to the following:

Sieve	Percent Passing
3"	100
1 1/2"	70 – 100
3/4"	50 – 85
No. 4	30 – 60
No. 200	0 - 10

- C. Stockpile the processed materials in such a manner to minimize segregation of particle sizes. All processed gravel shall come from approved stockpiles.

2.3 SAND BORROW

- A. Sand Borrow material shall be supplied from an off-site borrow area approved by the Engineer. Testing of the off-site Sand Borrow shall be at the Contractor's expense.
- B. Sand Borrow shall consist of clean, inert, hard, durable grains of quartz or other hard, durable, rock, free from loam or clay, surface coatings and deleterious materials. The allowable amount of material passing a No. 200 sieve as determined by ASTM-C117 shall not exceed 10% by weight.
- C. Material shall consist of a clean, non-plastic, granular material conforming to the requirements of a SW, SP or SM under the Unified Soil Classification System (USCS) (ASTM D2487).
- D. The material shall have the characteristics that when placed and compacted, the soil particles will bind together so as to form a solid, stable surface capable of supporting rubber-tired vehicular traffic during wet weather periods as well as extended dry weather periods. The borrow material shall not contain fines to the extent that the surface layer becomes "greasy" when wet.
- E. The material shall not contain stones larger than 3/8 inch in diameter.
- F. Material consisting of frozen clogs, ice and snow will be rejected.
- G. All sand borrow material to be used shall be subject to approval by Engineer, and Engineer reserves the right to reject any borrow material from the job that does not meet the above requirements.

2.4 STONE BORROW

- A. Crushed Stone Borrow

1. Crushed stone borrow shall consist of one of the following materials:

- a. Durable crushed rock consisting of the angular fragments obtained by breaking and crushing solid or shattered natural rock, and free from a detrimental quantity of thin, flat, elongated or other objectionable pieces. A detrimental quantity will be considered as any amount in excess of 15% of the total weight. Thin stones shall be considered to be such stones whose average width exceeds 4 times their average thickness. Elongated stones shall be considered to be stones whose average length exceeds 4 times their average width.
 - b. Durable crushed gravel stone obtained by artificial crushing of gravel boulders or fieldstone with a minimum diameter before crushing of 8 inches.
2. The crushed stone shall be free from clay, loam or deleterious material and not more than 1.0% of satisfactory material passing a No. 200 sieve will be allowed to adhere to the crushed stone.
 3. The crushed stone shall have a maximum percentage of wear as determined by the Los Angeles Abrasion Test (AASHTO-T-96) as follows:
 - a. For Class 1 Bit. Conc. 30%**
 - b. For Cement Concrete Aggregate 45%***
 - c. Crushed Stone for Subbase 45%

**Crushed stone for this use shall consist of crushed or shattered natural rock only. Crushed gravel stone will not be permitted.

***Except for 5000 psi or greater cement concrete and prestressed concrete which shall be 30%.
 4. The crushed stone shall conform to the grading requirements shown in the following grading Table.

Sieve Size	Percent by Weight Passing Through	
	Minimum	Maximum
1 ½" Crushed Stone		
2"	100	--
1 ½"	95	100
1"	35	70
¾"	0	25
¾" Crushed Stone		
1"	100	--
¾"	90	100
½"	10	50

3/8"	0	20
No. 4	0	5

5. Stone gradations shall vary depending on field use and shall be determined by Engineer.

B. Dense Graded Stone Borrow

1. The crushed stone used for backfill shall be a dense graded mixture and conform to the following gradation requirements.

Sieve Size (Square Openings)	Percent by Weight Passing Through	
	Minimum	Maximum
5/8"	100	100
1/2"	85	100
3/8"	15	45
#4	0	15
#8	0	5

2.5 ORDINARY BORROW

- A. Ordinary borrow shall have the physical characteristics of soils designated as type GW, GP, GM, SW, SP or SM, under USCS and shall not be specified as gravel borrow, sand borrow, special borrow material or other particular kind of borrow. It shall have properties such that it may be readily spread and compacted for the formation of embankments. The borrow shall not include rocks with a major dimension greater than 8 inches.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Prior to the placement of borrow material, site preparation shall be completed as required by the Contract Documents, and approved by the Engineer.
- B. Ensure that all materials are properly stockpiled on site to prevent contamination by other materials.
- C. Place borrow material over the entire area in uniform lifts and compact in accordance with Section 02315.
- D. Utilize on-site soils prior to using off-site borrow provided on-site soils meet the requirements of the specifications.
- E. Utilize gravel borrow in all locations where a surface treatment has not been specified but requires a firm finish surface.
- F. Processed gravel for pavement subbase is intended to provide a stable foundation for driveways, sidewalk and roadway repair where a gravel base has been specified.

- G. Borrow shall be used as a replacement for unsuitable materials where poor soil conditions are encountered during the progress of the work, where approved by the Engineer. Borrow type will be determined by the Engineer. Borrow material used as a replacement for unsuitable soil is not intended to be an aid to dewatering.
- H. Shape borrow used for pipe foundation material so that it supports the pipe properly and will not damage the pipe, bells, collars, or the pipe fittings.
- I. Place all borrow to keep it free of other materials and to prevent segregation.
- J. Maintain and repair all eroded areas during the life of this contract at no additional cost to the Owner.

END OF SECTION

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SECTION 02503

TESTING OF STORM DRAINAGE SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Testing of Storm Drainage Systems
- B. Related Sections
 - 1. Section 02516 – High Density Polyethylene Pipe and Fittings

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 TESTING OF STORM DRAINAGE SYSTEMS

- A. Visually inspect all storm drainage structures included in the Work to ensure that all structures are clean of debris and sediment, and have frames, covers, grates, inverts, sumps, and other required appurtenances.
- B. All flexible pipe types including polyvinyl chloride (PVC), high-density polyethylene (HDPE), or polypropylene (PP) shall be tested for deflection in accordance with Paragraph 3.1.C. of this Section at least forty five (45) days after it has been backfilled
- C. Allowable Deflection Test for flexible pipe types including polyvinyl chloride (PVC), high-density polyethylene (HDPE), or polypropylene (PP)
 - 1. Deflection shall be measured with a rigid mandrel (Go-No-Go) device cylindrical in shape and constructed with a minimum of nine or ten evenly spaced arms or prongs. Submit drawings of the mandrel with complete dimensions for each diameter of pipe to be tested. Hand-pull the mandrel through all drain lines.
 - 2. Uncover any section of pipe not passing the mandrel and replace the bedding and backfill to prevent excessive deflection. Replace sections of the pipe as necessary. Retest repaired pipe immediately upon backfilling of trench until acceptable.
 - 3. Retest the repaired section of pipeline again, from manhole to manhole, after the 45-day backfill period, until acceptable.

SECTION 02516

HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. High density polyethylene (HDPE) pipe for:
 - a. Storm drainage lines
 - 2. Types of HDPE piping specified in this Section include:
 - a. Corrugated exterior, smooth interior, solid wall HDPE pipe
- B. Related Sections
 - 1. Section 02315 – Excavation, Backfill, Compaction and Dewatering
 - 2. Section 02320 – Borrow Materials
 - 3. Section 02503 – Testing of Storm Drainage Systems

1.2 REFERENCES

- A. AASHTO M252 –Corrugated Polyethylene Drainage Pipe
- B. AASHTO M294 – Corrugated Polyethylene Pipe, 300- to 1200-mm Diameter
- C. AASHTO MP7 – Corrugated Polyethylene Pipe, 1300- to 1500-mm Diameter
- D. ASTM D1248 – Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable
- E. ASTM D2239 – Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
- F. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- G. ASTM D2412 – Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
- H. ASTM D2683 – Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
- I. ASTM D2737 – Standard Specification for Polyethylene (PE) Plastic Tubing
- J. ASTM D2837 – Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
- K. ASTM D3212 – Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

- L. ASTM D3261 – Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
- M. ASTM D3350 – Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
- N. ASTM F405 – Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings
- O. ASTM F667 – Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings
- P. ASTM F714 – Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- Q. ASTM F894 – Standard Specification for Polyethylene (PE) Large-Diameter Profile Wall Sewer and Drain Pipe
- R. ASTM F905 – Standard Practice for Qualification of Saddle Fusion Joints
- S. ASTM F2620 - Standard Practice of Heat Fusion Joining of Polyethylene Pipe and Fittings

1.3 SUBMITTALS

- A. Submit product data on the pipe, fittings, and accessories.
- B. Prior to first shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the appropriate ASTM standards specified herein.
- C. Submit one 12-inch long sample of each diameter of HDPE pipe proposed for use in the HDD operation.

1.4 QUALITY ASSURANCE

- A. Personnel performing heat fusion joining shall have adequate training and experience in the procedure, demonstrated by at least twelve months applicable experience.
- B. Use an adequate number of skilled laborers, equipment of adequate size, capacity, and quantity to perform the work of this Section, and its related Sections, in a timely manner.

1.5 DELIVERY, STORAGE AND HANDLING

- A. When lifting with slings, only wide fabric choker slings capable of safely carrying the load shall be used. Wire rope or chain shall not be used to handle pipe.

PART 2 PRODUCTS

2.1 MANUFACTURER – GENERAL

- A. The manufacturer shall have manufacturing and quality assurance facilities capable of producing and assuring the quality of the pipe and fittings required by these specifications.

- B. Pipe and fittings from different manufacturers shall not be interchanged for the same type of pipe and application.

2.2 PIPE IDENTIFICATION

- A. The following shall be continuously indent printed on the pipe or spaced at intervals not exceeding five-feet:
 - 1. Name and/or trademark of the pipe manufacturer.
 - 2. Nominal pipe size.
 - 3. Dimension ratio.
 - 4. The letters "PE" followed by the polyethylene grade in accordance with the ASTM designation, followed by the hydrostatic design basis in PSI.
 - 5. A production code from which the date and place of manufacture can be determined.

2.3 CORRUGATED EXTERIOR/SMOOTH INTERIOR HDPE PIPE AND FITTINGS

- A. General
 - 1. The polyethylene pipe and fittings shall comply with AASHTO M294, Type S (smooth wall interior).
 - 2. Piping shall be manufactured by Advanced Drainage Systems, Inc., or equal.
 - 3. Pipe material and fittings shall be high density polyethylene meeting ASTM D3350 minimum cell classification 324420C (4"-10") or 325420C (12"-60").
 - 4. Installation shall be in accordance with ASTM D2321.
 - 5. Pipe shall be joined with the bell-and-spigot joint. Gaskets and joint lubricant shall be utilized.
 - 6. Minimum parallel plate pipe stiffness shall be as recommended for each specified diameter pipe per ASTM Test Method D2412.
 - 7. The pipe and fittings shall be free of foreign inclusions and visible defects. The ends of the pipe shall be cut squarely and cleanly so as not to adversely effect joining.
 - 8. The nominal size of the pipe and fittings is based on the nominal inside diameter of the pipe. Corrugated fittings may be either molded or fabricated by the manufacturer. Fittings and gaskets supplied by manufacturers other than the supplier of the pipe shall not be permitted without the approval of the Engineer.

2.4 JOINTS FOR CORRUGATED PIPING

- A. General
 - 1. Joints of corrugated pipe sections and fittings other than smooth interior, shall be made with split couplings, corrugated to engage the pipe corrugations, and shall engage a minimum of 4 corrugations, 2 on each side of the pipe joint.

Where required by the Engineer, a neoprene gasket shall be utilized with the coupling to provide a soil tight joint.

2. Joints of smooth interior, corrugated pipe sections shall be as per manufacturer's instructions utilizing gasketed PVC or HDPE joints meeting ASTM D-3212.
3. Installation shall be in accordance with ASTM Recommended Practice D-2321 or as specified by the Engineer or local approving agency.

B. Leak Resistant/Silt-Tight Pipe

1. Pipe shall provide soil-tight joints with built-in gaskets. Bee joints shall be same as the outside diameter of the pipe.
2. Shall be ADS, N-12 IB ST (soil-tight joint type) piping, or equal.
3. Meets silt-tight & leak resistant (not defined as watertight) joint requirements.
4. For non-watertight connections, exterior HDPE culvert coupling may be used with dedicated ties.
5. Polyethylene flared end sections shall be manufactured to the same criteria as mainline pipe sections.
6. Non-Watertight Manhole Connections - To be made with non-shrink grout.

C. Manhole Boot Connection

1. Watertight seal made with rubber manhole boot as manufactured by Press Seal, or equal.
2. Alternatively, watertight seal made by Alok, or equal, in which case maximum insertion angle is 7 degrees.

PART 3 EXECUTION

3.1 PREPARATION

- A. The Contractor shall verify that the surface has been prepared to the proper line and grade by shooting invert elevation grades.

3.2 INSTALLATION

A. Open-Cut Installations

1. Polyethylene pipe and fittings shall be installed in accordance with ASTM Standards, and the manufacturer's recommendations.
2. Pipe is to be lifted or rolled into position, not dragged over the prepared bedding.
3. The pipe is to be set at the slope and grades indicated on the plans. Ensure pipe remains at proper grades by shoring it.
4. All HDPE piping shall be bedded in 6" of crushed stone unless noted otherwise.

5. Crushed stone shall be used as backfill to a point of 6" above the top of the pipe unless noted otherwise.
6. Clay dams shall be installed in the stone backfill as directed by the Engineer to prevent groundwater migration. Spacing shall be 50 ft. maximum. Clay borrow shall be in accordance with Section 02320 requirements for low permeability borrow.
7. Open-Trench Installations - Prepare the area in accordance with Section 02315 – Excavation, Backfill and Compaction.
8. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 inch per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.
9. Install piping and fittings true to alignment and grade. If necessary, each length of pipe shall be cleaned out before installation.

B. Joint Couplings

1. Joint couplings shall be installed in accordance with manufacturer's recommendations.
2. Remove the protective paper and wrap the collar around the pipe with the mastic side to the pipe. The overlap shall be at the top of the pipe.
3. Secure the steel straps.
4. The closing flap shall cover the exposed straps.
5. Encase the entire joint with a minimum of 8 inches of concrete on all sides. The concrete encasement shall extend along the pipe 12 inches on each side of the joint.

END OF SECTION

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SECTION 02530

MANHOLES AND CATCH BASINS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Precast concrete manholes
 - 2. Precast concrete catch basins
 - 3. Cast iron manhole frames and covers
 - 4. Cast iron catch basin frames and grates
- B. Related Sections
 - 1. Section 02503 - Testing of Storm Drainage Systems

1.2 REFERENCES

- A. AASHTO – American Association of State Highway and Transportation Officials, Standard Specifications for Highways and Bridges, most recent edition
- B. ASTM C32 - Standard Specification for Sewer and Manhole Brick (made from clay or shale)
- C. ASTM A48 – Standard Specification for Gray Iron Castings
- D. ASTM C150 – Standard Specification for Portland Cement
- E. ASTM C207 – Standard Specification for Hydrated Lime for Masonry Purposes
- F. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections
- G. ASTM C443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Piping Using Rubber Gaskets
- H. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes and Laterals
- I. ASTM C990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

1.3 SUBMITTALS

- A. Submit Shop Drawings, showing all details of construction, including, but not limited to, structure dimensions, reinforcing, joints, and pipe connections to structures.
- B. Submit on all materials and products included in this specification, including, but not limited to, manhole rungs, manhole frames and covers, dampproofing coating, brick masonry, mortar, non-shrink water-proof grout, catch basin frames and grates.
- C. Submit weights of manhole frames and covers and catch basin frames and grates.

- D. Submit design calculations including verification of adequate anti-flotation features and lateral earth pressures. Calculations shall verify that the manhole structure has been designed to withstand the burial depth, submergence due to flooding, flotation, and dead and live loads.

1.4 QUALITY ASSURANCE

- A. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer, or other representative of the Owner. Such inspection may be made at the place of manufacture, or at the Site after delivery, or at both places, and the materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Material rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. Materials which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced, at no additional cost to the Owner.
- B. At the time of inspection, the materials will be carefully examined for compliance with the latest ASTM designation specified and these Specifications, and with the approved manufacturer's drawings. Manhole sections will be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, and soundness. The surface shall be dense and close-textured.
- C. Imperfections in manhole sections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs will be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at 7 days and 5,000 psi at 28 days, when tested in 3 inch by 6 inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.
- D. Personnel shall have confined space entry training as appropriate for the work to be performed.
- E. Manholes and catch basins shall be designed for lateral earth pressures and to resist flotation.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE MANHOLE AND CATCH BASIN SECTIONS

- A. Precast concrete barrel sections and transition top sections, shall conform to ASTM C478 and the following requirements:
 - 1. The wall thickness shall not be less than 5 inches for 48 inch diameter reinforced barrel sections, 6 inches for 60 inch diameter reinforced barrel sections and 7 inches for 72 inch diameter reinforced barrel sections.
 - 2. Top sections shall be eccentric except that flat top sections shall be used where shallow cover requires a top section less than 4 feet as shown on the Drawings.
 - 3. Barrel sections shall have tongue and groove joints.

4. All sections shall be cured by an approved method and shall not be shipped nor subjected to loading until the concrete compressive strength has attained 3,000 psi and not before 5 days after fabrication and/or repair, whichever is longer.
5. Precast concrete barrel sections with precast top slabs and precast concrete transition sections shall be designed for a minimum of AASHTO HS20-44 loading plus the weight of the soil above at 120 pcf.
6. The date of manufacture and the name and trademark of the manufacturer shall be clearly marked on each precast section.
7. Precast concrete bases shall be monolithically constructed. The thickness of the bottom slab of the precast bases shall not be less than the barrel sections or top slab whichever is greater. Precast concrete bases shall be constructed with a 6 inch extended base, unless otherwise shown on the Drawings.
8. Knock out panels for piping shall be provided in precast sections at the locations shown on the Drawings. They shall be integrally cast with the section, 2½ inches thick and shall be sized as shown on the Drawings. There shall be no steel reinforcing in knock out panels.
9. The side wall height of the base section shall be a minimum of 12 inches above the top of the pipe coming into the manholes and catch basins.
10. A 4'-0" deep sump shall be provided below catch basin outlet pipes.

2.2 BRICK MASONRY

- A. Bricks shall be good, sound, hard and uniformly burned, regular and uniform in shape and size, of compact texture. Underburned or salmon brick will not be acceptable and only whole brick shall be used unless otherwise permitted. In case bricks are rejected by the Engineer, they shall be immediately removed from the site of the work and satisfactory bricks substituted, at no additional cost to the Owner.
 1. Bricks for the channels and shelves shall comply with the latest specifications of ASTM C32 for Sewer Brick, Grade SM.
 2. Bricks for building up and leveling manhole frames shall conform to ASTM C32 Grade MS.
 3. Poured concrete inverts will not be allowed.
- B. Mortar used in the brickwork shall be composed of one part Type II portland cement conforming to ASTM C150 to two parts sand to which a small amount of hydrated lime not to exceed 10 lbs. to each bag of cement shall be added.
- C. Sand used shall be washed, cleaned, screened, sharp and well graded as to different sizes and with no grain larger than will pass a No. 4 sieve. Sand shall be free from vegetable matter, loam, organic or other materials of such nature or of such quantity as to render it unsatisfactory.
- D. Hydrated lime shall conform to ASTM C207, Type S.

2.3 MANHOLE FRAMES AND COVERS

- A. Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind.

Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30B or ASTM A48, Class 35B.

- B. Manhole covers shall have a diamond pattern, pickholes and the word "DRAIN", as appropriate, cast in 3 inch letters. Manhole frame and covers shall be manufactured by East Jordan Iron Works; Mechanics Iron Foundry; Neenah Foundry or equal.
- C. Manhole frames and covers shall be approved for use by the Massachusetts Department of Transportation – Highway Division, and Gardner Dept. of Public Works.
- D. Manhole frames and covers shall comply with the detail shown on the Drawings.
- E. Manhole frames and covers shall be designed for a minimum of AASHTO HS20-44 loading.

2.4 CATCH BASIN FRAMES AND GRATES

- A. Catch basin frames and grates shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Grate and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30B or ASTM A48, Class 35B.
- B. The catch basin frames and grates shall comply with the details shown on the Drawings, and requirements of the Gardner Dept. of Public Works.
- C. Catch basin frames and grates shall be designed for a minimum of AASHTO HS20-44 loading.

2.5 JOINTING PRECAST MANHOLE SECTIONS

- A. Tongue and groove joints of precast manhole sections shall be sealed with a preformed flexible joint sealant. The preformed flexible joint sealant shall conform to ASTM C990.

2.6 MANHOLE RUNGS

- A. Manhole rungs shall be drop front design, 14 inches wide with an abrasive step surface, steel reinforced, copolymer, polypropylene, plastic. Manhole rungs shall conform to OSHA requirements.

2.7 FLEXIBLE PIPE TO-STRUCTURE CONNECTORS

- A. The flexible pipe-to-structure connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.
- B. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.
- C. The external bands shall be made entirely of 304 series non-magnetic stainless steel.
- D. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.

- E. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:
1. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.
 2. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.
 3. Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.

2.8 NON-SHRINK, WATER-PROOF GROUT

- A. Non-shrink, water-proof grout shall be Hallemite; Waterplug; Embeco; or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation

1. Construct manholes and catch basins to the dimensions shown on the Drawings and as specified. Protect all work against flooding and flotation.
2. Set precast concrete barrel sections so as to be plumb and with sections in true alignment with a ¼ inch maximum tolerance to be allowed.
3. Install the precast sections in a manner that will result in a watertight joint. Seal the joints of precast concrete barrel sections with the preformed flexible joint sealant used in sufficient quantity to fill 75% of the joint cavity. Fill the outside and inside precast section joints with non-shrink grout and finish flush with the adjoining surfaces. Plug holes in the concrete barrel sections required for handling or other purposes with a non-shrink, water-proof grout or concrete and rubber plugs, and finish flush on the inside.
4. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides.

B. Pipe Connections

1. Stubs
 - a. Connect pipe stubs for future extensions to the structures as shown on the Drawings and close the stub end by a suitable watertight plug.
2. For pipes with smooth exterior surfaces (PVC, ductile iron, HDPE pressure pipe, steel, etc), use flexible pipe-to-structure connectors.
3. Where flexible pipe-to-structure connectors cannot be used, such as pipes with rough, irregular or corrugated exterior surfaces (concrete, corrugated metal, HDPE drainage pipe, etc):
 - a. After the new pipe has been set in place, completely fill the hole around the new pipe and structure with non-shrink, water-proof grout.
 - b. Place a 6 inch thick concrete encasement a total of 12 inches in length around the pipe stub adjacent to the exterior wall of the structure. Concrete shall have a 28 day compressive strength of 3,000 psi.

C. Manhole Rung Installation

1. Steel reinforced copolymer polypropylene plastic steps shall be press fitted by hand driven hammer into preformed holes in cured precast sections, on 12 inch centers, by the precast concrete manufacturer.

D. Brickwork

1. Mix mortar only in such quantity as may be required for immediate use and use before the initial set has taken place. Do not retain mortar for more than one and one-half hours and constantly work over with a hoe or shovel until used. Anti-freeze mixtures will not be allowed in the mortar. No masonry shall be laid when the outside temperature is below 40°F unless provisions are made to protect the mortar, bricks, and finished work from frost by heating and enclosing the work with tarpaulins or other suitable material. The Engineer's decision as to the adequacy of protection against freezing shall be final.
2. Construct channels and shelves of brick as shown on the Drawings. The brick channels shall correspond in shape with the lower half of the pipe. The top of the shelf shall be set at the elevation of the crown of the highest pipe and shall be sloped 1 inch per foot to drain toward the flow through channel. Construct brick surfaces exposed to sewage flow with the nominal 2 inch by 8 inch face exposed (i.e., bricks on edge).
3. Set manhole covers and frames and catch basin frames and grates in a full mortar bed and bricks, a maximum of 12 inches thick for conical tops and 6 inches thick for flat top sections, utilized to assure frame and cover are set to the existing grade. Reset the manhole frames and covers and catch basin frames and grates to final grade prior to placement of final paving.

3.2 CLEANING

- A. Clean new manholes and catch basins of silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

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SECTION 02532

STORMWATER TREATMENT UNIT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. The work covered by this section consists of the construction of a structural underground storm water oil and sediment separator. The Contractor shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications

B. Related Sections

1. Section 02503, Testing Storm Drainage Systems
2. Section 02530 Manholes and Catchbasins

1.2 SUBMITTALS

- A. Submit Shop Drawings, showing details of construction, reinforcing, joints, pipe connections to structures and manhole frames and cover.
- B. Submit design calculations including verification of adequate anti-flotation features and lateral earth pressures. Calculations shall verify that the manhole structure has been designed to withstand the burial depth, submergence due to flooding, flotation with ground water at the surface elevation, and dead and live loads. Calculations should verify that 80% total suspended solids will be removed on an average yearly basis. These calculations must be stamped by a Professional Engineer.

1.3 REFERENCE STANDARDS

- A. ASTM D4097 - Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.
- B. ASTM C478 - Standard Specification for Pre-cast Reinforced Concrete Manhole Sections.
- C. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, using Rubber Gaskets.

1.4 QUALITY ASSURANCE

- A. The stormwater treatment unit shall remove oil and sediment from stormwater during wet weather events. Refer to Section 2.10 for performance requirements.
- B. The stormwater treatment unit shall be Stormceptor or approved equal.

1.5 HANDLING AND STORAGE

- A. Care shall be taken in loading, transporting, and unloading to prevent damage to materials during storage and handling

PART 2 PRODUCTS

2.1 GENERAL

- A. The stormwater treatment unit shall be circular and constructed from pre-cast concrete circular riser and slab components. The internal fiberglass insert shall be bolted and sealed watertight inside the reinforced concrete component. The stormwater treatment unit shall be capable to be used as a bend or junction structure within the stormwater drainage system.

2.2 PRECAST CONCRETE SECTIONS

- A. Precast concrete barrel sections and transition top sections, shall conform to the requirements of Section 02530.

2.3 BRICK MASONRY

- A. Bricks for building up and leveling manhole frames shall conform to ASTM C32 Grade MS, meeting the requirements of Section 02530.

2.4 MANHOLE FRAMES AND COVERS

- A. Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind. Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30B or ASTM A48, Class 35B.
- B. Manhole covers shall have a diamond pattern, pickholes and the unit's name cast into the cover. Manhole frame and covers shall be manufactured by East Jordan Iron Works; Mechanics Iron Foundry; Neenah Foundry or equal.
- C. Manhole frames and covers shall comply with the detail shown on the Drawings.
- D. Manhole frames and covers shall be designed for a minimum of AASHTO HS20-44 loading.

2.5 JOINTING PRECAST MANHOLE SECTIONS

- A. Tongue and groove joints of precast manhole sections shall be sealed with a preformed flexible joint sealant. The preformed flexible joint sealant shall conform to ASTM C990.

2.6 MANHOLE RUNGS

- A. Manhole rungs shall be drop front design, 14 inches wide with an abrasive step surface, steel reinforced, copolymer, polypropylene, plastic. Manhole rungs shall conform to OSHA requirements.

2.7 FLEXIBLE PIPE-TO-STRUCTURE CONNECTORS

- A. The flexible pipe-to-structure connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.
- B. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.
- C. The external bands shall be made entirely of 304 series non-magnetic stainless steel.
- D. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.

- E. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:
 - 1. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.
 - 2. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.
 - 3. Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.

2.8 FIBERGLASS

- A. The fiberglass portion of the stormwater treatment unit shall be constructed in accordance with ASTM D-4097 Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.

2.9 NON-SHRINK, WATER-PROOF GROUT

- A. Non-shrink, water-proof grout shall be Hallemite; Waterplug; Embeco; or equal.

2.10 PERFORMANCE

- A. The stormwater treatment unit shall be an online unit capable of conveying 100% of the design peak flow (25cfs).
- B. The stormwater treatment unit shall be designed to remove at least 80% of the suspended solids on an annual aggregate removal basis for the water quality flow (7cfs).
- C. The stormwater treatment unit must be capable of trapping fine sand, silt, clay and organic particles in addition to larger sand and gravel particles.
- D. The stormwater treatment unit shall be equipped with an internal high flow bypass that regulates the flow rate into the treatment chamber and conveys high flows directly to the outlet so the scour and/or re-suspension of material previously collected in the separator does not occur.
- E. The stormwater treatment units shall contain a fiberglass insert, bolted and sealed watertight to the inside of the bypass chamber to divert low to normal stormwater flows into the treatment chamber. A minimum of 16-inches of oil storage shall be lined with fiberglass to provide secondary containment of any hydrocarbon materials.
- F. The difference between the inlet and outlet elevations shall be a minimum of 3-inches. The unit shall trap pollutants so they are not scoured away from the separator during backwater conditions.
- G. The stormwater treatment unit shall be capable of removing 95% of floatable free oil.
- H. The separator must be capable of trapping fine sand, silt, clay and organic particles in addition to larger sand, gravel particles and small floatables.
- I. The stormwater quality treatment device shall be sized to a specific particle size distribution that is clearly identified in both diameter and specific gravity. The example below is a Fine Particle Size that is a common PSD used in design of water quality devices to ensure proper design for capturing smaller particles and the high load of associated pollutants.

Table 2.10 – Particle Size Distribution:

Amount	Diameter	Specific Gravity
20%	20 micron	1.3
20%	60 micron	1.8
20%	150 micron	2.2
20%	400 micron	2.65
20%	2000 micron	2.65

PART 3 EXECUTION**3.1 INSTALLATION**

- A. The stormwater treatment unit shall be constructed as shown on the Drawings and specified herein. Install at elevations and locations shown on the Drawings unless or as otherwise directed by the Engineer.
- B. Place precast base units in accordance with Section 02530. The floor of the installed precast base section shall be checked for level at four prominent locations. Floor shall be within 0.50" of level.
- C. All structural system components and system piping shall be made watertight.
- D. Holes made for handling precast sections shall be filled with a nonshrink grout.

3.2 LEAKAGE TEST

- A. Leak test in conjunction with the pipeline in accordance with Section 02503.

3.3 CLEANING

- A. Clean new stormwater treatment unit of silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

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SECTION 02535**BREAKING INTO EXISTING MANHOLES AND CATCHBASINS****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Breaking through the walls and inverts of existing manholes and catchbasins.
2. Connecting new pipes to existing structures.
3. Ancillary work associated with making the new connections to the existing structures.

1.2 REFERENCES

- A. ASTM C443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Piping Using Rubber Gaskets.
- B. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.

1.3 SUBMITTALS

- A. Submit shop drawings showing pipe connection details.

1.4 QUALITY ASSURANCE

- A. Personnel shall have confined space entry training as appropriate for the work to be performed.

PART 2 PRODUCTS**2.1 MATERIALS****A. Flexible Pipe-to-Structure Connectors**

1. The flexible connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.
2. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.
3. The external bands shall be made entirely of 304 series non-magnetic stainless steel.
4. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.
5. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:
 - a. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.

- b. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.
 - c. Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.
- B. Non-shrink, water-proof grout
 - 1. Non-shrink, water-proof grout shall be Hallemite; Waterplug; Embeco; or equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General
 - 1. Core drill into existing structures in such a fashion as to make an opening of suitable size to accommodate the connecting pipe without excessive damage to the existing structure.
- B. Manholes
 - 1. For manholes, break out and rebuild existing inverts as required to provide an adequate base under the new channels being installed, and shaped to provide smooth continuous hydraulic flow through the manhole.
 - 2. Control existing flows as required during the period of construction. No sewage or drainage will be permitted to flow directly against concrete or other masonry work until it is at least 48 hours old.
 - a. Temporary handling of sewage or drainage flows may be accomplished by inserting pipes from the inlet to the outlet of the manhole and by using temporary plugs, where appropriate, provided that such pipes do not interfere with satisfactory completion of the work and shaping of the inverts, nor cause excessive backing-up in the existing system upstream of the diversion. In cases where this type of temporary handling of flows is not possible, provide the necessary dams, plugs, etc., as required in upstream manholes, and pump the flow around the structure under construction.
 - b. When sewage is pumped or otherwise diverted around a particular structure, it shall be discharged back into the sewage system through existing downstream manholes. Under no circumstances shall sewage be permitted to run onto the surface of the ground.
- C. Catchbasins
 - 1. All catchbasin openings, created as a result of the removal and replacement of the existing drains connected to the catchbasins with new drain pipes, shall be sealed. This work shall be performed using masonry to match existing construction, where applicable, and non-shrink grout to provide a neat patch.
- D. Pipe Connections

1. Rebuild and tightly close existing manhole walls and inverts and catchbasin walls to provide an integral, water-tight structure around the new pipes.
2. For pipes with smooth exterior surfaces (PVC, ductile iron, HDPE, steel, etc), use flexible pipe-to-structure connectors.
3. Where flexible pipe-to-structure connectors cannot be used, such as pipes with rough, irregular or corrugated exterior surfaces (concrete, corrugated metal or HDPE, etc):
 - a. After the new pipe has been set in place, completely fill the hole around the new pipe and structure with non-shrink, water-proof grout.
 - b. Place a 6 inch thick concrete encasement a total of 12 inches in length around the pipe stub adjacent to the exterior wall of the structure. Concrete shall have a 28 day compressive strength of 3,000 psi.

END OF SECTION

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SECTION 02740

HOT MIX ASPHALT (HMA) PAVEMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. HMA Driveways and Parking Areas
 - 2. HMA Sidewalk
- B. For the purposes of this Section, Hot Mix Asphalt (HMA) and bituminous concrete have the same meaning.
- C. Related Requirements
 - 1. Section 02315 - Excavation, Backfill, Compaction and Dewatering

1.2 REFERENCES

- A. Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 Edition as amended
- B. ASTM D2041 - Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
- C. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1990 Edition, as amended
- D. AASHTO M 320
- E. AASHTO T 96 - L.A. Abrasion Test
- F. AASHTO T 195 (Ross Count)
- G. TAI - (The Asphalt Institute) - MS-3 Asphalt Plant Manual
- H. TAI - (The Asphalt Institute) - MS-8 Asphalt Paving Manual

1.3 SUBMITTALS

- A. Job mix formula for each mix specified under this Section.
- B. Certificate indicating the mixes specified meet or exceed the requirements specified herein.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with TAI Manual MS-8., Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 Edition as amended
- B. Mixing Plant: Conform to TAI Manual MS-8., Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 Edition as amended

- C. Obtain materials from same source throughout.

PART 2 PRODUCTS

2.1 MATERIALS

A. General

1. Bituminous materials shall conform to the requirements of these Specifications.
2. Bitumen delivered to the Project or to a mix plant must be accompanied by a proper certificate signed by the producer's authorized representative. Shipments of material not accompanied by a certificate will not be accepted for use in the Work.

- B. Hot Mix Asphalt Paving shall be Class I, Type I-1, as specified in Sections 460 and M3.11.0 of the above referenced Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges," 1988 edition, as amended.

C. Hot Mix Asphalt

1. These mixtures shall be composed of mineral aggregate, mineral filler (if required), bituminous material, and reclaimed asphalt pavement (RAP). The use of RAP shall be at the Contractor's option unless otherwise provided by the special provisions of the contract.
2. Plants producing recycled mix shall be equipped so that they can properly proportion, blend and mix all components of a recycled mixture so that the end product is in conformance with the designated job-mix formula.
3. The mineral aggregate, filler (if required), bituminous material, asphalt modifier (if required) and RAP shall be proportioned and mixed to conform with the designated mixture as tabulated in Table A hereafter.
4. In order to obtain standard texture, density and stability, provide a specific Job-Mix Formula for the particular uniform combination of materials and sources of supply to be used on the Project. The Job-Mix Formula for each mixture shall establish a single percentage of aggregate passing each required sieve size, a single percentage of bituminous material to be added to the aggregate and for batch plants, the number of seconds for dry mixing time and the number of seconds for wet mixing time. AASHTO T 195 (Ross Count) with a coating factor of 98% will be used when necessary to evaluate proper mixing time. The Job-Mix Formula shall also specify a single source or uniform blend of particular sources for fine aggregate, a single source for each nominal size of coarse aggregate, a single source of supply for minor filler and sources for asphalt. The Job-Mix Formula shall bind the Contractor to furnish paving mixtures not only within the master ranges, but also conforming to the exact formula thus set up for the Project, within allowable tolerances as follows:

No. 4 and larger sieve	±7.0%
No. 8 and smaller sieves, except No. 200	±4.0%
Passing No. 200 sieve	±2.0%
Asphalt	±0.4%

TABLE A
PERCENT BY MASS PASSING SIEVE DESIGNATION

Standard Sieves	HMA Base Course	HMA Binder Course	HMA Dense Binder Course	HMA Top Course	HMA Modified Top Course	HMA 3/8" Modified Top Course	HMA Dense Mix	HMA Surf. Treat.
2 in.	100							
1 in.	57-87	100	100		100	100		
3/4 in.		80-100	80-100		95-100	100		
5/8 in.				100				
1/2 in.	40-65	55-75	65-80	95-100	79-100	95-100	100	
3/8 in.				80-100	68-88	68-88	80-100	100
No. 4	20-45	28-50	48-65	50-76	48-68	48-68	55-80	80-100
No. 8	15-33	20-38	37-49	37-49	33-46	33-53	48-59	64-85
No. 16				26-40	20-40	20-40	36-49	46-68
No. 30	8-17	8-22	17-30	17-29	14-30	14-30	24-38	26-50
No. 50	4-12	5-15	10-22	10-21	9-21	9-21	14-27	13-31
No. 100*				5-16	6-16	6-16	6-18	7-17
No. 200	0-4	0-5	0-6	2-7	2-6	2-6	4-8	3-8
Bitumen	4-5	4.5-5.5	5-6	5.6-7.0	5.1-6	5-6	7-8	7-8

*Percentages shown in table above for aggregate sizes are stated as proportional percentages of total aggregate for the mix.

Unless authorized by the Engineer, no Job-Mix Formula will be approved which specifies:

Less than 6% binder for HMA Top Course

Less than 5.5% binder for HMA 3/8" Modified Top Course and HMA Modified Top Course for mixes containing RAP.

Should a change of sources of materials be made, a new job mix formula shall be established by the Contractor before the new material is used. When unsatisfactory results or other conditions make it necessary, the Engineer may establish a new Job-Mix Formula.

The aggregate will be accepted in stockpile at the plant site. The bituminous material will be accepted on certification. If the Contractor elects to furnish HMA from more than one plant, the job mix formula must be adhered to by all plants.

5. The use of RAP will be permitted at the option of the Contractor and provided that the end product is in conformance with the designated Job-Mix Formula. The proportion of RAP to virgin aggregate shall be limited to a maximum of 40% for drum mix plants and 20% for modified batch plants. The maximum amount of RAP for surface courses shall be 10%.
6. Two or more Job-Mix Formulas may be approved for a particular plant; however, only material conforming to one Job-Mix Formula will be permitted to be used on any given calendar day. The Job-Mix Formula shall bind the Contractor to furnish paving mixtures not only within the master ranges, but also conforming to the exact formula thus set up for the Project.
7. Coarse Aggregate
 - a. The coarse mineral aggregate shall be clean, crushed rock consisting of the angular fragments obtained by breaking and crushing shattered natural rock, free from a detrimental quantity of thin or elongated pieces, free from dirt or other objectionable materials, and shall have a percentage of wear, as determined by the Los Angeles Abrasion Test (AASHTO T 96), of not more than 30. It shall be surface dry and shall have a moisture content of not more than 0.5% after drying. The use of crushed gravel stone will not be permitted.

8. Fine Aggregate

- a. The fine aggregate shall consist of one of the following:
 - 1) 100% Natural Sand
 - 2) 100% Stone Sand
 - 3) A blend of sand and stone screenings the proportions of which shall be approved by the Engineer
 - 4) A blend of natural sand and stone sand
- b. Natural sand shall consist of inert, hard, durable grains of quartz or other hard, durable rock, free from topsoil or clay, surface coatings, organic matter or other deleterious materials. When the primary source of material, passing the No. 200 sieve, is obtained from natural sand, these fines must be approved prior to use.
- c. Stone sand shall be a processed material prepared from stone screenings to produce a consistently graded material conforming to specification requirements.
- d. The stone screenings shall be the product of a secondary crusher and shall be free from dirt, clay, organic matter, excess fines or other deleterious material.
- e. The fine aggregate as delivered to the mixer shall meet the following requirements:

Sieve Designation	Percent Passing	
	Minimum	Maximum
3/8 in.	95	100
No. 8	70	95
No. 50	20	40
No. 200	2	16

- f. In the fine aggregate sieve analysis (passing No. 8), the amount between two successive sieves (No. 16, No. 30, No. 50 and No. 100) shall not exceed 33% of the fine aggregate total.
- g. Plants that experience a large variation in the quality and gradation of their primary fine aggregate sources and have difficulty in consistently providing fine aggregate that conforms to the requirements of this specification, shall be equipped with an approved fine aggregate system for processing fine aggregate that *will* meet the requirements of this specification.

D. Reclaimed Asphalt Pavement (RAP)

1. Reclaimed Asphalt Pavement (RAP) shall consist of the material obtained from highways or streets by crushing, milling or planing existing pavements. This material shall be transported to the mix plant yard and processed through an approved crusher so that the resulting material will contain no particles larger than 1½ inches. The material shall be stockpiled on a free draining base and

kept separate from the other aggregates. The material contained in the stockpiles shall have a reasonably uniform gradation from fine to coarse and shall not be contaminated by foreign materials.

E. Mineral Filler

1. Mineral filler shall consist of approved Portland Cement, limestone dust, hydrated lime, stone float or stone dust. Stone dust shall be produced from crushed ledge stone and shall be the product of a secondary crusher so processed as to deliver a product of uniform grading. Mineral filler shall completely pass a No. 50 sieve and at least 65% shall pass a No. 200 sieve.

F. Bituminous Materials

1. The asphalt cement for the mixture shall be the grade designated by the Engineer and shall conform to the requirements of M3.01.01. When required an approved anti-stripping additive conforming to M3.10.0 shall be added to the asphalt cement.
2. Tack coat shall consist of either emulsified asphalt, Grade RS-1 conforming to Section M3.03.0.
3. For any bituminous mixture containing RAP, submit in addition to the Job-Mix Formula, the amount and type of asphalt modifier to be added to the mixture to restore the asphalt properties of the RAP to a level that is reasonably consistent with the requirements of current specifications for new asphalt. The restored asphalt when recovered by the Abson Method from the recycled mixture shall have a minimum penetration at 77 degrees Fahrenheit of 50 and a maximum absolute viscosity at 140 degrees Fahrenheit of 800 pascal seconds.
4. Only Performance Graded Asphalt Binder grades PG 64-28 or PG 52-34 will be used as modifiers and shall meet the requirements of AASHTO M 320.

PART 3 EXECUTION

3.1 PAVING – GENERAL

- A. Maintain pavement under this Contract during the guarantee period of one year and promptly (within 3 days of notice given by the Engineer) refill and repave areas which have settled or are otherwise unsatisfactory for traffic.
- B. All pavement thicknesses referred to herein are compacted thicknesses. Place sufficient mix to ensure that the specified thickness of pavement results.
- C. Paving operations shall be conducted so that there is no physical or thermal segregation of the hot mix asphalt material during transport or placement of the mix. Should segregation be observed by the Engineer, suspend paving operations immediately. The Engineer may reject material, which appears to be defective based on observation. Such rejected material shall not be used in the Work and shall be removed and replaced by the Contractor at no additional cost to the Owner.
- D. Existing drainage patterns shall not be altered by the new pavement construction unless otherwise shown on the Drawings.

- E. Furnish and spread calcium chloride on disturbed surfaces to control dust conditions when necessary, or upon direction of the Engineer.
- F. No permanent mixtures shall be placed when the air temperature is below 40 degrees Fahrenheit, or when the material on which the mixtures are to be placed contains frost or has a surface temperature that the Engineer considers too low.
- G. When the air temperature falls below 50 degrees Fahrenheit, extra precautions shall be taken in drying the aggregates, controlling the temperatures of the materials and placing and compacting the mixtures.
- H. In no case will pavement be placed until the gravel base is dry and compacted to at least 92.0% maximum density at optimum moisture content.
- I. All pavement edges that have been damaged shall be sawcut again if necessary to re-establish a straight clean line between the existing pavement and trench patch.
- J. Tack Coats
 - 1. Apply tack coat on the binder prior to placing the top course. The tack coat shall be RS-1 emulsion and shall be applied at a rate of 0.05 gallons per square yard on binder courses and streets to be overlaid.
 - 2. Perform a test pass with tack truck. Test pass shall be used to determine how long the tack coat needs to cure prior to beginning paving operations and for operator to adjust spray bar and nozzles as necessary. Tack shall be uniformly sprayed; "streaking" will not be allowed. Placement of top course shall not occur until the tack coat cures or "breaks," with color changing from brown to black.
 - 3. The edges of the existing pavement where the joints are to be formed shall be thoroughly coated with tack coat to ensure adhesion between the two pavements.
 - 4. The contact surfaces of curbs, castings, and other structures shall be painted with a tack coat prior to placement of paving.
- K. Top course mixes shall provide for 4% air voids in the finished product. The initial in-place voids shall not exceed 7.5%. Final in-place voids shall not be below 2.5%. Additional asphalt content shall not be added for the sole purpose of reducing the in-place voids. If the in-place voids are too high or the paving is expected to occur during cold weather, more compactive effort will be required to adjust the void content rather than increasing the asphalt content.
- L. Breakdown rolling shall not occur before the HMA has cooled to a temperature of 320 degrees Fahrenheit, and shall be completed before the HMA mat has cooled to a temperature of 275 degrees Fahrenheit. Intermediate rolling shall be completed prior to the HMA mat attaining a temperature of 200 degrees Fahrenheit. Finish rolling shall be completed prior to the HMA mat attaining a temperature of 150 degrees Fahrenheit. Roller and paver speeds shall be agreed upon with the Engineer prior to placing HMA to ensure mix temperature requirements will be met.
- M. Thermal segregation of the HMA shall be limited to a maximum of 20 degrees Fahrenheit.

- N. Cascading HMA material on the top of the finished mat with rakes or shovels will not be permitted. Coarse Aggregate dislodged as a result of unavoidable hand work shall be removed from the surface prior to rolling.
- O. Place and compact HMA materials by steel-wheeled rollers of sufficient weight to compact the HMA to 92.5% of the calculated Theoretical Maximum Density (TMD) in accordance with ASTM D2041.
- P. Along curbs, structures and all other places not accessible with a roller, the paving mixture shall be thoroughly compacted with tampers. Such tampers shall not weigh less than 25 pounds and shall have a tamping face no more than 50 square inches in size. The surface of the mixture after compaction shall be smooth and true to the established line and grade.
- Q. No vehicular traffic shall be permitted on the newly completed pavement until adequate stability has been attained and the material has cooled to below 140 degrees Fahrenheit or sufficiently to prevent distortion or loss of fines. HMA delivery trucks (loaded or empty) shall not be permitted on the newly completed pavement until the asphalt has cooled to below 90 degrees Fahrenheit. If the climatic or other conditions warrant, the period of time before opening to traffic may be extended at the discretion of the Engineer.
- R. Following all paving, the area along the edge of all pavement shall be backed up with gravel, or loam and seed as required, so that it is flush with the adjacent paving. Whenever possible, the final surface of the backup material shall slope away from the surface edge for drainage runoff.
- S. Following all paving, clean all catch basins and remove and dispose of all debris.

3.2 PAVING – BASE AND BINDER COURSE

- A. Place base and/or binder course as soon as possible after the gravel base has been prepared, shaped and compacted for all streets.
- B. Binder course shall be placed on reclaimed or fully reconstructed roads as shown on the Drawings and as specified herein in preparation for the full-width top course.
- C. Structure Adjustments
 - 1. All manhole frames, catch basin frames and utility boxes are to be lowered prior to placement of the base and/or binder course. After placing the binder course, they shall be raised to the grade of the binder course until such time as the top course is placed, unless the period of time between the placement of the binder course and the placement of the top course is less than 2 weeks, in which case the frames may be raised to the grade of the top course. All excavated materials removed for raising of the frames and utility boxes are to be replaced with concrete. This ring of concrete shall be filled flush with the surrounding binder course.
 - 2. Adjustments to existing municipally owned utility structures and appurtenances such as drainage manholes, catch basins and gate valve boxes, both within the area of excavation and within the existing paved surface, will be carried out by the Contractor prior to installation of the top course. The raising of other structures (privately owned utilities) as required to properly complete the final

paving work should be completed by the structure owners. It is the responsibility of the Contractor to coordinate all such work and to assure that all structures are properly raised in a timely manner.

- D. Maintain base and/or binder course in a condition suitable for traffic throughout the construction period. Defects shall be repaired within 3 days of notification.
- E. Prepare the base and/or binder course for placement of the top course. The base shall be graded prior to the placement of the binder course. The binder course shall be regraded, placing additional HMA where settling has occurred, repairing the existing surface and replacing broken or damaged sections at no additional cost to the Owner. The binder course surface shall be in all respects acceptable to the Engineer before the final pavement is placed. The surface shall then be broom cleaned.

3.3 HMA SIDEWALK

- A. Remove a sufficient depth of the temporary surfaces and gravel to provide for the thickness of surface specified. The gravel surface thus exposed shall be fine graded and thoroughly compacted using mechanical tampers. The edges of the existing surface that will abut the repair shall be trued up and cut to smooth and even lines at this time. Cutting shall be done with a saw. The existing paved surface shall be cut to firm ground that has not sloughed or sagged into or toward the excavation.
- B. Binder mix shall then be placed in the thickness specified in the Drawings and compacted to a point below the surrounded area to allow the second course to be placed flush with the adjacent surfaces. A top course of mix shall then be placed at the thickness specified in the Drawings to bring the sidewalk surface to the appropriate grade.
- C. Sidewalk shall be neat in appearance and shall blend in with the existing adjoining pavement.

3.4 QUALITY CONTROL

- A. Provide a written Quality Control Plan (QCP) for the Project. As a minimum, the QCP shall contain the following information:
 - 1. QCP shall be contract specific, stating how the contractor proposes to control the materials, equipment, and construction operations including subcontractors and suppliers as well as production facilities and transportation modes to the Project for the HMA pavement operations.
 - 2. The QCP shall be submitted no later than 15 days prior to commencing the paving operations.
 - 3. The QCP shall contain the name, telephone number, duties, and employer of all quality control personnel necessary to implement the QCP. A Quality Control Technician (QCT) shall be required. The person(s) responsible for conducting quality control and inspection activities to implement the QCP. There may be more than one QCT on a project.
 - 4. The Engineer may require the replacement of ineffective or unqualified equipment or Quality Control personnel. Construction operations may be required to stop until Quality Control corrective actions are taken.

- B. All roller operators shall use infrared pistol thermometers to measure the temperature of the mat during rolling operations.

3.5 ACCEPTANCE

- A. Acceptance testing shall prove density of the HMA to be at least 92.5% of the TMD, not to exceed 97%.

END OF SECTION

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SECTION 02770

GRANITE CURBING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Vertical Granite Curbing
- B. Related Sections
 - 1. Section 02320, Borrow Material

1.2 REFERENCES

- A. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1986 Edition, as amended.
- B. Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges", 1988 Edition, as amended.

1.3 SUBMITTALS

- A. Submit to the Engineer, shop drawing showing dimensions, layouts and details of construction and accessories required.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Granite Curbing
 - 1. In accordance with the Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges", 1988 Edition, as amended, granite curbing shall conform to the requirements of Article M.9.04.1.
 - 2. Granite curbing shall be hard and durable, fundamentally of light color, of general uniform texture, of smooth splitting appearance, and free from seams or imperfections.
 - 3. No top projections of greater than 1/8 inch shall exist, and no more than 1" projections shall exist on the back and bottom of each section.
 - 4. Vertical Granite Curbing
 - a. Granite curbing shall be Type SB in accordance with Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges", 1988 Edition, as amended.
 - b. Standard laying length shall be no less than 6-feet.
 - 5. Granite Slope Curbing

- a. Granite curbing shall be Type SB in accordance with Commonwealth of Massachusetts Department of Public Works "Standard Specifications for Highways and Bridges", 1988 Edition, as amended.
 - b. Standard laying length shall be no less than 2-feet.
- B. Mortar
 - 1. In general, mortar shall be one part Portland cement and two parts (by volume) dry fine aggregate.
 - 2. Hydrated lime in an amount of less than 4 pounds of lime to each bag of Portland cement may be added if approved by the Engineer.
- C. Gravel Base
 - 1. Processed gravel base shall be as specified in Section 02320 (Borrow Materials).
- D. Concrete Base
 - 1. Fill concrete shall be Massachusetts Department of Transportation (formerly MHD) Standard 3000 psi mix.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All granite curbing, inlets, and corners shall be installed in accordance with the "Commonwealth of Massachusetts Department of Public Works Standard Specifications for Highway and Bridges 1988, as amended.
- B. Excavation shall be made of sufficient depth and width to accommodate the granular base.
- C. The line of the curbing shall be set straight and true for the full depth.
- D. Granite edging shall be set on an 8 inch minimum depth compacted processed gravel base. The gravel base shall be fine graded and thoroughly compacted with approved mechanical compactors. Concrete fill shall be placed on the front and back of the granite curbing in lieu of gravel backfill in locations where a sidewalk does not directly abut the back of the curb. In locations where a sidewalk directly abuts the back of the curb, concrete fill is only required on the front side.
- E. All granite edging shall have a 4 inch reveal from the finished pavement surface, except in the case of transition curbing, and shall be flush with adjacent sidewalks.
- F. Where edging is to be set on a radius between 10 feet and 160 feet, the maximum laying length shall be 3 foot. Where edging is to be set on a radius of 10 feet or less, the maximum laying length shall be 1 foot.
- G. The joints of all granite curbing shall be filled with cement mortar and neatly pointed on exposed surfaces. The joints of the stone curbing shall be pointed with mortar for the full depth of the curbing. Excess mortar shall be satisfactorily cleaned from the curb.

- H. At approximately 50-foot intervals, a ½ inch joint shall not be filled with mortar to be left free for expansion.
- I. The joints of all granite curbing shall be filled with cement mortar and neatly pointed on exposed surfaces. Excess mortar shall be satisfactorily cleaned from the curb.

END OF SECTION

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SECTION 02775**PORTLAND CEMENT CONCRETE SIDEWALKS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Sidewalks including wheelchair ramps
- B. Related Sections
 - 1. Section 02315 - Excavating, Backfilling, Compaction and Dewatering
 - 2. Section 02320 - Borrow Material
 - 3. Section 03100 - Concrete Forms and Accessories
 - 4. Section 03200 - Concrete Reinforcement
 - 5. Section 03300 - Cast-in-Place Concrete

1.2 REFERENCES

- A. ACI 301 (American Concrete Institute) - Specifications for Structural Concrete for Buildings.
- B. ACI 304 (American Concrete Institute) - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- C. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- D. ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- E. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
- F. ASTM C33 - Concrete Aggregates.
- G. ASTM C94 - Ready Mix Concrete.
- H. ASTM C150 - Portland Cement
- I. ASTM C260 - Air-Entraining Admixtures for Concrete.
- J. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- K. ASTM C494 - Chemical Admixtures for Concrete.
- L. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- M. ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

PART 2 PRODUCTS**2.1 MATERIALS**

- A. Portland cement concrete shall be an Air-Entrained 4,000 psi, ¾-inch mix in accordance with Section 03300 – Cast-in-Place Concrete.
- B. Premolded expansion joint filler shall meet the requirements of AASHTO Designation M153, Type II.
- C. Premolded expansion joint filler shall meet the requirements of AASHTO M 213.
- D. Gravel borrow for the sidewalk base shall be in accordance with Section 02320 - Borrow Material.
- E. Sheet membrane curing compounds shall meet the requirements of ASTM C 309.

PART 3 EXECUTION

3.1 PREPARATION

- A. Shape the subgrade parallel to the proposed surface and compact thoroughly. Fill depressions with suitable material and compact again until the surface is smooth and hard.
- B. Install a gravel base to a depth of 12 inches on top of the subgrade. Fine grade the gravel base and compact thoroughly with approved mechanical tampers.
- C. Place Portland cement panels 4 inches thick for sidewalks and 6 inches thick for driveways and driveway aprons in accurately set, smooth wooden or steel forms of sufficient strength to resist springing out of shape. The gravel base shall be fine graded and recompacted immediately ahead of pouring the concrete. Sidewalks shall match the top of the existing adjacent sidewalk panels.
- D. Completely remove mortar and dirt from forms that have been previously used. The forms shall be well staked and thoroughly graded and set to the established lines with their upper edge conforming to the grade of the finished walk. Oil forms before placing concrete.

3.2 INSTALLATION

- A. Reinforce the concrete slab with welded wire fabric, 6x6-W4 x W4.
- B. Place concrete to half the desired depth at which point the welded wire fabric shall be placed or raised to the surface. The remaining concrete can then be placed. Care should be exercised to avoid walking in areas with reinforcing
- C. No finish work shall be performed while free water is present. After water sheen has disappeared and concrete has started to stiffen, edging operations, where required, shall be completed. After edging and joining operations, the surface shall be floated. Immediately following floating, the surface shall be steel-troweled. Following troweling, the concrete sidewalk shall be given a broom finish.
- D. Cure the concrete by covering with burlap or other acceptable material that shall be kept moist for at least five (5) days after placing the concrete.
- E. Cure the concrete by the application of a liquid membrane-curing compound as soon as free water has disappeared and the surface cannot be marred. The application should be uniform and without puddles.

END OF SECTION

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SECTION 02830**SEGMENTAL RETAINING WALL SYSTEM****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Segmental retaining wall system
- B. Related Sections
 - 1. Section 02075 – Geosynthetics
 - 2. Section 02315 – Excavation, Backfill, Compaction and Dewatering
 - 3. Section 02320 – Borrow Materials

1.2 REFERENCES

- A. National Concrete Masonry Association Design Manual for Segmental Retaining Walls – Latest Edition.

1.3 SUBMITTALS

- A. Submit wall manufacturer product information for wall system proposed including a statement indicating project experience within the last five years of similar or greater size and complexity. Project references shall include the following minimum information:
 - 1. Project name and location
 - 2. Product brochures
 - 3. Photographs of completed wall systems
 - 4. Owner reference
- B. Final design and layout, which shall include detailed design computations and all details, dimensions, quantities and cross sections necessary to construct the wall. The design shall conform to the latest edition of the National Concrete Masonry Association Design Manual for Segmental Retaining Walls. The detailed plans shall be 24" x 36" prints with Project Name and Number. The plans to be submitted shall include, but not be limited to, the following items:
 - 1. Plan and elevation sheets for each wall segment, containing the following:
 - a. An elevation view of the wall indicating the elevation at the top of the wall, elevation at all horizontal and vertical break points, elevation at least every twenty-five (25) feet along the wall, elevation at the top of leveling pads, elevations and type of reinforcement, the designation as to the type of unit, and the location of the original and final ground line.

- b. A plan view of the wall, which shall indicating the offset from the construction centerline or baseline to the face of the wall at all changes in horizontal alignment and the limit of the widest unit.
 - c. Any general notes required for design and construction of the wall.
 - d. All horizontal and vertical curve data affecting wall construction.
- 2. All details for leveling pads.
 - 3. Backfill gradation, placement, and compaction requirements.
 - 4. Detailed design computations.
 - 5. The plans and calculations shall be prepared, stamped and signed by a Registered Professional Engineer in the Commonwealth of Massachusetts.
 - 6. The computations shall include all detailed explanation of any symbols and computer programs used in the wall design.

1.4 CLOSEOUT SUBMITTALS

A. As-Built Drawings

- 1. After completion of the installation and prior to final acceptance, the Contractor shall submit As-Built Drawings of the wall construction.

1.5 QUALITY ASSURANCE

A. Certifications

- 1. The wall designer shall inspect the wall construction and provide a Certification to the Engineer that it has been constructed in accordance with their design.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All backfill material used in the wall construction shall be as specified by the wall designer on the approved wall plans. Backfill material requirements shown on the Drawings indicate the maximum particle size and maximum percentage of fines acceptable for use in the wall design. On-site material is not expected to be suitable as wall backfill.
- B. Retaining wall systems to be used on this Project shall be Unilock Concord XL SRW system, or approved equal from one of these manufacturers:
 - 1. Versa-Lok
 - 2. Redi-Rock
 - 3. Or equal

PART 3 EXECUTION

3.1 PREPARATION

A. Foundation Preparation

1. The foundation for the structure shall be graded level for a width as shown on the submitted wall plans. Prior to wall construction, the foundation shall be compacted as indicated on the submitted wall plans. Any foundation soils found to be unsuitable shall be removed and replaced as directed by the Engineer. Subgrade preparation shall be performed in accordance with Section 02315.

3.2 WALL ERECTION

- A. The wall system, including but not limited to, concrete units, reinforcement, and backfill materials, shall be constructed in accordance with the manufacturer's recommendations and the latest edition of the National Concrete Masonry Association Design Manual for Segmental Retaining Walls, unless superseded by these Specifications or the submitted wall plans.
- B. Backfill placement shall closely follow erection of each course of wall units. Backfill shall be placed in such a manner as to avoid any damage to the wall materials or misalignment of the units. Any wall components, which become damaged or disturbed during backfill placement, shall be either removed and replaced or corrected at the Contractor's expense, as directed by the Engineer. All backfill material shall meet the requirements contained in Section 02315 unless superseded by the submitted wall plans.

END OF SECTION

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SECTION 02870

SITE AND STREET FURNISHINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Benches
- B. Related Sections
 - 1. Section 02315 – Excavation, Backfill and Compaction for Utility Systems
 - 2. Section 02320 – Borrow Materials

1.2 REFERENCES

- A. ASME B18.2.1 (2010) Square and Hex Bolts and Screws (Inch Series)
- B. ASME B18.2.2 (2010) Standard for Square and Hex Nuts
- C. ASTM A123/A123M (2009) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- D. ASTM A153/A153M (2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- E. ASTM A185/A185M (2007) Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
- F. ASTM A307 (2010) Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile
- G. ASTM A36/A36M (2008) Standard Specification for Carbon Structural Steel
- H. ASTM A615/A615M (2009b) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- I. ASTM A653/A653M (2011) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- J. ASTM A780/A780M (2009) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- K. ASTM B108/B108M (2008) Standard Specification for Aluminum-Alloy Permanent Mold Castings
- L. ASTM B209 (2010) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- M. ASTM B62 (2009) Standard Specification for Composition Bronze or Ounce Metal
- N. ASTM C150/C150M (2011) Standard Specification for Portland Cement

1.3 SUBMITTALS

- A. Shop drawings showing the plan layout, spacing of fixtures, foundation dimensions, hardware anchorage, and schedule of components.
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.
 - 1. Submit location of product manufacture

- C. Product Schedule: For site furnishings, use same designations indicated on Drawings.
- D. Maintenance Data: For site furnishings, include maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of site and street furnishings through one source from a single manufacturer.
- B. Installation Drawings - Submit templates, erection and installation drawings indicating thickness, type, grade, class of metal, and dimensions. Show construction details, reinforcement, anchorage, and installation.
- C. Assembly Instruction Drawings - Submit assembly instruction drawings showing layout(s), connections, bolting and anchoring details in accordance with manufacturer's standards. Submit drawings showing scaled details of proposed site furnishings, elevations for each type of site furnishing; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Bench Replacement Slats: Not less than two full-size units for each size indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Ship items knocked-down (KD) ready for site assembly. Packaged components shall be complete including all accessories and hardware. Materials shall be delivered, handled, and stored in accordance with the manufacturer's recommendations. Site furnishings shall be inspected upon arrival at the job site for conformity to specifications and quality in accordance with paragraph MATERIALS. Protect from corrosion, staining, and other types of damage. Store items in designated area free from contact with soil and weather. Remove and replace damaged items with new items.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide materials that are the standard products of a manufacturer regularly engaged in the manufacture of such products. The materials provided shall be of a type with proven satisfactory usage for at least two years.
 - 1. Metals
 - a. Metallic materials and products shall conform to Section 05500 MISCELLANEOUS METALS. Furnish metal components with factory-drilled holes and free of excess weld and spatter. Metal components with holes that will not be filled by hardware or hidden by other components will be rejected. Structural steel products shall conform to ASTM A36/A36M, ASTM A500/A500M and ASTM A501.
 - 2. Structural Tubing
 - a. ASTM A500/A500M.
 - 3. Steel Pipe and Fittings

- a. Steel pipe shall conform to ASTM A53/A53M, Type E or S, Grade B; standard malleable iron fittings shall conform to ASTM A47/A47M.

2.2 SITE STANDARDS

- A. Site furnishings shall be furnished with the dimensions and requirements indicated. Site furnishings placed in children's outdoor play areas shall meet the safety requirements of ASTM F 1487 for entrapment; sharp points, edges, and protrusions; entanglement; pinch, crush, and shear points. Site furnishings to be included in children's outdoor play areas shall be free from sharp vertical edges and any protruding elements and designed with a minimum radius of 1/2 inch on all vertical edges; this includes, but is not limited to, seat walls, containment curbs and planters. Where practical, horizontal edges exposed to children's activities shall be rounded.

2.3 BENCHES AND CHAIRS

- A. Furnish benches and chairs with no sharp edges or protruding hardware.
 - 1. Height: The height above finished grade or specified surface shall be between 18-20 inches and level.
 - 2. Seat: The seat surface shall be pitched or slotted to shed water; the seat depth shall be between 12-18 inches and pitched down at the back at a 0-5 degree angle. Seat shall have a minimum width of 24 inches per person, and shall overhang the support base by a minimum of 4 inches for heel space and to facilitate rising from a seating position.
 - 3. Back Rest: When back rests are required, the height shall be between 15-18 inches from the top of the seat and the connection shall be at a 90-110 degree angle to the seat.
 - 4. Arm Rest: When arm rests are required, a minimum of 6 inches height from the seat and a minimum arm rest width of 1-1/2 inches shall be provided.
 - 5. Weight Limit: Seats shall support a minimum 300 lbs. for each person they are designed to accommodate.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Verify that finished grades and other operations affecting mounting surfaces have been completed prior to the installation of site furnishings. Site furnishings shall be installed plumb and true, at locations indicated, in accordance with the approved manufacturer's instructions.

3.2 ASSEMBLY AND ERECTION OF COMPONENTS

- A. New parts shall be acquired from the manufacturer; substitute parts will not be accepted unless approved by the manufacturer. When the inspection of parts has been completed, the site furnishings shall be assembled and anchored according to manufacturer's instructions or as indicated. When site furnishings are assembled at the site, assembly shall not interfere with other operations or pedestrian and vehicular circulation.

3.3 ANCHORAGE, FASTENINGS, AND CONNECTIONS

- A. Furnish metal work, mounting bolts or hardware in ample time for securing into concrete or masonry as the work progresses. Provide anchorage where necessary for fastening furniture or furnishings securely in place. Provide, for anchorage not

otherwise specified or indicated, slotted inserts, expansion shields, and power-driven fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screws for wood. Do not use wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish the fastenings to which they are applied. Conceal fastenings where practicable.

3.4 RESTORATION AND CLEAN UP

- A. When the installation has been completed, clean up and protect the site. Existing areas that have been damaged from the installation operation shall be restored to original condition at Contractor's expense.
 - 1. Clean Up
 - a. The site shall be cleaned of all materials associated with the installation. Site furnishing surfaces shall be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents shall be according to manufacturer's instructions or as indicated.
 - 2. Protection
 - a. The area shall be protected as required or directed by providing barricades and signage.
 - 3. Disposal of Materials
 - a. Excess and waste material shall be removed and disposed of off Owner's property

3.5 RE-INSTALLATION

- A. Where re-installation is required, the following shall be accomplished:
 - 1. Re-install the product as specified. Material acquisition of replacement parts is the responsibility of the Contractor. Provide replacement materials that are new and supplied by the original manufacturer to match.
 - 2. Damage caused by the failed installation shall be repaired.

END OF SECTION

SECTION 02920

LAWNS AND GRASSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. New loam and seed areas
 - 2. Loam, starter fertilizer, lime, lawn seed, and hydric seed

1.2 SUBMITTALS

- A. Lawn seed mixture including percent by weight of each seed type, and manufacturer/Supplier name.
- B. Suitable laboratory analysis of the topsoil to determine the quantity of fertilizer and lime to be applied.
- C. Lime and starter fertilizer application rates based on laboratory soil tests.
- D. A sworn certificate indicating each variety of seed, weed content, germination of seed, net weight, date of shipment and manufacturer's name shall accompany each seed shipment.

1.3 QUALITY ASSURANCE

- A. Place seed only between the periods from April 15th to June 1st, and from August 15th to October 1st, unless otherwise approved by the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Loam
 - 1. Loam from offsite, as required for Work, shall be taken from a well-drained, arable site, and shall be free of subsoil, large stones, earth clods, sticks, stumps, clay lumps, roots or other objectionable, extraneous matter or debris. Loam shall also be free of quack-grass rhizomes, Agropyron Repens, and the nut-like tubers of nutgrass, Cyperus Esculentus, and all other primary noxious weeds. Loam shall not be delivered or used for planting while in a frozen or muddy condition. Topsoil as delivered to the Site or stockpiled shall have pH between 6.0 and 7.0 and shall contain not less than 5 percent or more than 8 percent organic matter as determined by loss of ignition of moisture-free Samples dried at 100 degrees Celsius.
 - 2. Onsite loam may be available from stripping of onsite topsoil. Onsite topsoil shall be tested as specified below and shall be amended as necessary to meet Specification requirements for loam.
 - 3. Soil Analysis: The Contractor shall submit representative Samples of loam, which he intends to bring onto the Site, and Samples of loam from onsite

sources, to a Soil and Plant Testing Laboratory acceptable to the Engineer. All reports shall be sent to the Engineer for approval. Samples of loam to be brought to the Site must be approved prior to delivery of soil. Deficiencies in the loam shall be corrected by the Contractor, as directed by the Engineer after review of the testing agency report by a soils consultant. Testing reports shall include the following tests and recommendations.

- a. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System.
 - b. The silt clay content shall be determined by a Hydrometer Test.
 - c. Percent of organics shall be determined by an Ash Burn Test or Walkley/Black Test.
 - d. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Soluble Salts, and acidity (pH).
 - e. Soil analysis tests shall show recommendations for soil additives to correct soils deficiencies as necessary, and for additives necessary to accomplish particular lawn and planting objectives noted.
 - f. All tests shall be performed in accordance with the current standards of the Association of Official Agriculture Chemists.
4. Loam for General Lawn and Site Restoration Areas: Loam shall conform to the following grain size distribution for material passing the #10 sieve:

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	100	----
18	84	100
35	63	72
140	26	40
270	22	34
0.002 mm	2	5

¹The ratio of the particle size for 80% passing (D_{80}) to the particle size for 30% passing (D_{30}) shall be 6 or less ($D_{80}/D_{30} < 6$).

²Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.

³Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.

⁴The organic content shall be between 4.0 and 6.0 percent.

5. Place a minimum of 4 inches of loam.

B. Typical Sand Amendment

1. Sand to be mixed with topsoil shall meet the following requirements. The material shall be uniformly graded coarse sand consisting of clean, inert, rounded grains of quartz or other durable rock and free from loam or clay, surface coatings, mica, other deleterious materials with the following gradation.

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	100	----
18	60	80
35	35	55
60	8	20
140	0	8
270	0	3
0.002 mm	0	0.3

¹Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 10% by weight of the total sample.

²The ratio of the particle size for 70% passing (D_{70}) to the particle size for 20% passing (D_{30}) shall be 3.0 or less ($D_{70}/D_{20} < 3.0$).

³Tests shall be combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.

C. Starter Fertilizer

1. Starter fertilizer shall bear the manufacturer's name and guaranteed statement of analysis, and shall be applied in accordance with the manufacturer's directions.
2. Starter fertilizer shall be Scott's Starter Fertilizer, or equal, with timed nitrogen release to prevent burning.

D. Lime

1. Lime shall be an agricultural type ground limestone.
2. Lime shall be pelletized type for prolonged time release to soil.
3. Lime shall be applied at the rates recommended in the soil analysis.

E. Seed

1. Seed shall be of the previous year's crop.
2. Required properties:
 - a. Purity > 90% ($> 97\%$ for athletic fields)
 - b. Germination > 80% ($> 85\%$ for athletic fields)
 - c. Crop < 0.5%
 - d. Weed < 0.3%

- e. Noxious Weed – 0%
 - f. Inert < 8%
3. Grass seed shall conform to the mix indicated on the plans in proportion by weight and weed content and shall pass the minimum percentages of purity and germination as indicated for same.

PART 3 EXECUTION

3.1 PREPARATION

- A. After rough grading of the subgrade has been completed and approved, the subgrade surface shall be scarified to a depth of four (4) inches. Then furnish and install a layer of loam providing a rolled four (4) inch thickness. Any depressions which may occur during rolling shall be filled with additional loam, regraded and rerolled until the surface is true to the finished lines and grades. All loam necessary to complete the Work under this section shall be supplied by the Contractor.
- B. The ground surface shall be fine graded and raked to prepare the surface of the loam for lime, fertilizer and seed.
- C. The loam shall be prepared to receive seed by removing stones and grading to eliminate water pockets and irregularities prior to placing seed. Finish grading shall result in straight uniform grades and smooth, even surfaces without irregularities to low points.
- D. All stones over one-half ($\frac{1}{2}$) inch in diameter remaining on the surface after raking shall be removed.
- E. Shape the areas to the lines and grades required. The Contractor's attention is directed to the scheduling of Loaming and Seeding of graded areas to permit sufficient time for the stabilization of these areas.
- F. All areas disturbed by construction within the property lines and not covered by structures, pavement, or bark mulch shall be loamed and seeded.
- G. Limestone shall be thoroughly incorporated into the loam layer at a minimum rate of 3 ton per acre or more as recommended by the loam analysis in order to provide a pH value of 5.5 to 6.5.
- H. Fertilizer shall be spread on the top layer of loam at the minimum rate of 500 pounds per acre or more as recommended by the loam analysis and worked into the surface

3.2 LOAM AND SEED AREAS

- A. The seed mixtures shall be applied at a minimum rate of 200 pounds per acre, or 4.5 pounds per 1,000 square feet.
- B. Seed shall be sown at the rates indicated above by rotary or drop spreader. Sowing shall be done on a calm, dry day. Immediately before seeding, the soil shall be lightly raked. One half the seed shall be sown in one direction and the other half at right angles to the original direction. It shall be lightly raked into the soil to a depth not

over 1/4 inch and rolled with a hand roller weighing not over 100 pounds per linear foot of width.

1. Straw mulch shall be applied immediately after seeding at a rate of 1.5 to 2 tons per acre. Mulch that blows or washes away shall be replaced immediately and anchored using appropriate techniques.
 2. The surface shall be watered and kept moist with a fine spray as required, without eroding the soil, until the grass is well established. Any areas, which are not satisfactorily covered with grass, shall be reseeded, and all noxious weeds shall be removed.
- C. Unless otherwise approved, seeding shall be done between the periods from April 15th to June 1st, and August 15th to October 1st, when soil conditions and weather are suitable for such Work.

3.3 MAINTENANCE

- A. Maintenance shall include watering, weeding, removal of stones and other foreign objects over one half (1/2) inch in diameter, cutting the grass until final acceptance. Mow at least weekly, removing no more than 30-40 percent of the leaf tissue using well sharpened blades. Mow grass between one (1) and two (2) inches high in the spring and fall. Mowing heights shall be an additional one-half to an inch in the summer to reduce temperature stress. Leave the clippings in place to help recycle essential plant nutrients needed for growth. All bare or dead spots which become apparent shall be properly prepared, re-loamed, limed, aerated, fertilized, and reseeded as many times as necessary to secure a good growth. The entire area shall be maintained, watered and cut until final acceptance of the lawn installation.
- B. The dressed and seeded areas shall be sprinkled with water as necessary from time to time. Signs and barricades should be placed to protect the seeded areas.
- C. To be acceptable, seeded areas shall consist of a uniform stand without bare or dead spots of at least 90 percent established permanent grass species, with uniform count of at least 200 plants per square foot.
- D. The Engineer shall determine whether maintenance shall continue in any part.
- E. After all necessary corrective Work and clean-up has been completed, and maintenance instructions have been received by the Owner, the Engineer will certify in writing the acceptance of the lawns.
- F. Substantial Completion will not be achieved until the seeded areas have demonstrated a satisfactory stand of growth as determined by the Engineer. Seeded areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer, shall be renovated, reseeded and maintained meeting all requirements as specified herein.

END OF SECTION

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DIVISION 3 - CONCRETE

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Wood Form Material
 - 2. Prefabricated Forms
 - 3. Formwork Accessories
- B. Related Sections
 - 1. Section 03300 - Cast-in-Place Concrete

1.2 REFERENCES

- A. American Concrete Institute (ACI)
 - 1. ACI 301 - Specifications for Structural Concrete for Buildings
 - 2. ACI 318 - Building Code Requirements for Reinforced Concrete
 - 3. ACI 347 - Guide to Formwork for Concrete
- B. American Society for Testing and Materials (ASTM)
 - 1. D4 - Standard Test Method for Bitumen Content
 - 2. D6 - Standard Test Method for Loss on Heating of Oil and Asphaltic Compounds
 - 3. D71 - Standard Test Method for Relative Density of Solid Pitch and Asphalt (Displacement Method)
 - 4. D217 - Standard Test Method for Cone Penetration of Lubricating Grease
 - 5. D1056 - Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
 - 6. D1751 - Standard Specifications for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
 - 7. D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
 - 8. D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications
- C. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing

D. National Institute of Standards and Technology (NIST)

1. Voluntary Product Standard PS 1-95 - Construction and Industrial Plywood

1.3 SUBMITTALS

- A. Drawings showing schedule of placement, location of all construction joints and all control joints with methods of forming. Show the location and elevation of all sleeves, wall pipes and embedded items.
- B. Drawings showing sizes and materials for forms, form bracing, and form ties.
- C. Product Data on form release agent, permanent formwork and inserts.

1.4 DESIGN REQUIREMENTS

- A. Design formwork and shoring at the Contractor's expense by a Professional Engineer registered in the State where the work will be performed to conform to all design and code requirements in ACI 301, ACI 318 and ACI 347 and other applicable regulations and codes. The design shall consider any special requirements that may result due to the use of super plasticized and/or retarded set concrete.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

- A. Plywood: Class I High Density Overlay plyform, exterior grade, not less than 5 ply nor less than 5/8 inches thick conforming to Voluntary Product Standard PS 1-95
- B. Lumber: Douglas Fir species, No. 1 grade S4S with grade stamp clearly visible

2.2 PREFABRICATED FORMS

- A. Manufacturers:
 1. Symons Corporation, DesPlains, Illinois
 2. HICO Corporation, Bronx, NY
 3. Or equal
- B. Preformed Steel Forms: Minimum 16 gage (1.5 mm), tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearances of finished concrete surfaces; with clean, warp free, undented, ungouged, undamaged surfaces
- C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearances of finished concrete surfaces

2.3 FORMWORK ACCESSORIES

- A. Form Ties:
 1. Ties for foundation walls shall be metal and designed with removable setback cones so that after removal of the projecting part, no metal shall remain within 1½ inches of the face of the concrete.

2. Form ties for tanks, wet wells, pump chambers, below grade structures and other water retaining structures shall have a neoprene waterstop washer placed on each form tie, or on the inside tie rods for systems which use she bolts, and shall have setback cones.
 3. Flat bar snap ties for panel forms shall have plastic or rubber inserts with 1½ inch minimum depth to allow patching of tie hole after removal.
 4. Setback cones shall be wood or plastic tapered cones 1 inch diameter and 1½ inches deep to allow filling and patching of the concrete surface after removal.
 5. Common wire ties shall not be used.
- B. Form Release Agent:
1. Non-staining and non-emulsifiable type which will not stain concrete or absorb moisture nor interfere with adherence of any material to be applied to concrete surfaces.
 2. Form release agent for potable water tanks and structures shall be vegetable oil based and shall be NSF approved for use with potable water.
- C. Corners:
1. Chamfered No. 1 Poplar wood strips; ¾ inch by ¾ inch; maximum possible lengths
- D. Dovetail Anchor Slot:
1. Galvanized steel 22 gage thick; non-filled, release tape sealed slots for securing to concrete formwork
- E. Flashing Reglets:
1. Galvanized steel 26 gage thick, longest possible lengths, with alignment splines for joints, release tape sealed slots for securing to concrete formwork
- F. PVC Waterstops:
1. Virgin polyvinyl chloride, minimum 2000 ± 50 psi tensile strength, minus 50°F to plus 170°F working temperature range, 9 inches (see designer note above) wide, 3/8 inches thick, factory made corner sections, heat welded jointing; manufactured by Paul Murphy Plastics, Greenstreak, Vinylex or equal
 2. Exceed the requirements set forth in the U.S. Army Corps of Engineers waterstop specification (CRD-C572-84)
 3. Must exhibit zero water leakage when tested in accordance with the American Concrete Institute (ACI) standard test method for waterstop
 4. Heat fused field splices shall be tested for a complete seal by use of a corona discharge unit.
 5. Multi-rib design with center bulb shall be used for all expansion joints as noted on Drawings and proposed for the work.

6. Ribbed flat heavy duty design shall be used for all construction joints as noted on Drawings and proposed for the work.

G. Hydrophilic Strip Waterstop:

1. Hydrophilic waterstop shall be Hydrotite as supplied by Greenstreak or equal.
2. The waterstop shall be composed of chloroprene rubber and chloroprene rubber modified to impart hydrophilic properties.
3. The waterstop shall have a delay coating to inhibit initial expansion due to moisture present in fresh concrete.
4. The hydrophilic waterstop shall have the following performance requirements:

CHLOROPRENE RUBBER

Property	Test Method	Required Limits
Tensile Strength	ASTM D 412	1300 PSI min.
Ultimate Elongation	ASTM D 412	400% min.
Hardness (Shore A)	ASTM D 2240	50 +/- 5
Tear Resistance	ASTM D 624	100 lb/inch min.
Tensile Strength	ASTM D 412	350 PSI min.
Ultimate Elongation	ASTM D 412	600% min.
Hardness (Shore A)	ASTM D 2240	52 +/- 5
Tear Resistance	ASTM D 624	50 lb/inch
Expansion Ratio	Volumetric Change - Distilled Water @ 70° F	3 to 1 min.

5. The hydrophilic waterstop shall be adhered to the concrete surface in accordance with the manufacturer's requirements.

H. Compressible Filler:

1. Closed cell expanded neoprene, ASTM D1056, Grade No. 2C1, ozone and weather resistant

I. Premolded Joint Filler:

1. Buildings and Structures: Self-expanding cork, ASTM D1752, Type III; and Federal Specification HH-F-341-F, Type II, Class C; capable of one directional swelling up to 140% of its original thickness
2. Sidewalks: Asphalt impregnated, ASTM D1751, ¾ inch thick unless otherwise shown on the Drawings

J. Elastomeric Bearing Pads:

1. 60 Durometer neoprene rubber conforming to AASHTO M251

PART 3 EXECUTION

3.1 GENERAL

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.
- B. Review all work prepared by others to receive work of this Section and correct any defects affecting installation. Commencement of work by the Contractor will be construed as complete acceptance of preparatory work by others.
- C. Handle and store materials separately in such manner as to prevent intrusion of foreign matter, segregation, or deterioration. Do not use foreign materials or those containing frozen material. Remove improper and rejected materials immediately from point of use. Cover materials and accessories during construction period.

3.2 EARTH FORMS

- A. Earth forms are not permitted.

3.3 FORM PREPARATION

- A. Coat contact surfaces of forms with a form release agent prior to form installation.
- B. Thoroughly clean steel forms between uses using high pressure water or jet or sand blasting to remove all mill scale, concrete laitance or other ferrous deposits from the contact surfaces of the forms.
- C. Before re-use of wood forms, thoroughly clean form contact surfaces, repair damaged areas and remove projecting nails. A partial or complete steel lining on wood sheathing or plywood will not be allowed.

3.4 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements of ACI 301 and the following additional requirements:
 - 1. Variation from plumb in the lines and surfaces of columns, piers, and in walls
 - a. In any 10 feet of length $\frac{1}{4}$ inch
 - b. Maximum for entire length $\frac{1}{2}$ inch
 - 2. Variation of the linear building lines from established position in plan and related positions of columns, walls and partitions:
 - a. In any bay $\frac{1}{4}$ inch
 - b. In any 20 foot of length $\frac{1}{4}$ inch
 - c. Maximum for the entire length $\frac{1}{2}$ inch
 - 3. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls:
 - a. Minus $\frac{1}{8}$ inch
 - b. Plus $\frac{1}{4}$ inch

3.5 JOINTS

- A. Construction and expansion joints indicated on the Drawings are mandatory and shall not be omitted.

- B. Use premolded joint filler at expansion joints unless otherwise noted.
- C. Form construction and expansion joints with a keyway and waterstop unless otherwise shown on the Drawings. The depth of the keyway shall be approximately 3 inches, and the minimum width of keyway shall be one-third the width of the wall or floor section unless otherwise shown on the Drawings. The maximum width of any key at a joint with waterstop shall be 3 inches. Construction and expansion joints are to be formed in place prior to notifying the Engineer for inspection of formwork.
- D. Where joints other than those shown are required, obtain approval prior to installation.
- E. For slab-on-grade construction (welded wire fabric reinforcement only) with large floor areas where construction joints are not shown, the maximum area per section is approximately 600 square feet, but will not limit the number of sections which may be placed at one time. For structural slabs reinforced with deformed bars where construction joints are not shown on the Drawings, the maximum area will be approximately 900 square feet. Slab dimensions between construction joints for floor areas shall be as "square" as possible, but the length shall not exceed 1.5 times the width under any circumstances.
- F. For slab-on-grade construction, a preformed metal keyway with removable top strip may be substituted for intermediate construction joints unless otherwise shown on the Drawings.
- G. Joints shall be straight and true. Brace all slab bulkheads adequately to keep joints straight. Construction joints in slabs exceeding 5 inches in thickness shall be keyed using a keyway nominally 3-5/8 inches by 1/3 of the slab thickness but not greater than 3 inches wide.
- H. Wall construction joints shall be placed as shown on the Drawings, or the maximum spacing of vertical construction joints in walls shall not exceed 40 feet where construction joints are not shown.
- I. Joints not indicated or specified shall be placed to least impair strength of structure and shall be subject to approval of the Engineer.

3.6 INSERTS, EMBEDDED ITEMS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in or passing through concrete work in conformance with requirements of ACI 318, paragraph 6.3, "Conduits and pipes embedded in concrete."
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, wall pipes, anchor bolts and other inserts. Wall pipes and sleeves shall conform to the requirements of Section 15050.
- D. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed or damaged during placement of concrete.
- E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at the bottom of forms to allow flushing water to drain.

- F. Close temporary openings with tight fitting panels, flush with inside face of forms and neatly fitted so that joints will not be apparent in exposed concrete surfaces after concrete placement.

3.7 WATERSTOPS

- A. Install PVC waterstops in all construction and expansion joints in walls and slabs unless otherwise noted on the Drawings. Position waterstop in the center of the joint and extend the entire length of the joint. Securely fasten waterstop to reinforcing steel or formwork on both sides at 12 inch maximum spacing. Provide 2 inch minimum clearance between waterstop and reinforcing steel.
- B. Heat and splice PVC waterstop with a thermal splicing unit designed for that specific purpose. Only properly mitered, straight butt splices shall be made in the field. All field splices shall be tested for a complete seal by use of a corona discharge unit.
- C. No holes will be permitted in the PVC waterstop. Nail holes or other penetrations in the waterstop shall be repaired prior to placement of concrete.
- D. Hydrophilic waterstop shall be installed in accordance with the manufacturer's recommendations.
- E. The Engineer shall approve of the proposed location, concrete cover and steel reinforcement prior to the installation of any Hydrophilic waterstop.
- F. The Hydrophilic waterstop ends shall be cut square or mitered at corners. In addition, all waterstop splices shall be sealed in accordance with the manufacturer's requirements.

3.8 ACCESSORIES

- A. Install form liners into formwork prior to placement of reinforcing steel or concrete in compliance with the manufacturer's requirements.
- B. Neoprene waterstop washers are to be placed along the form ties or inside ties so they are in the middle third of the thickness of the structural element.
- C. Position recessed dovetail anchor slots for masonry anchors to spacing and intervals specified in Section 04810 and shown on the Drawings.
- D. Position metal fabrications accessories and inserts supplied under Sections 05120 and 05500 as specified therein and shown on the Drawings.
- E. Position flashing reglets supplied under Section 07620 as specified therein and shown on the Drawings.

3.9 FORM REMOVAL

- A. The Contractor shall be responsible for damage resulting from form removal. Forms and shoring for structural slabs or beams shall remain in place in accordance with requirements in ACI 301. Form removal shall also conform to the requirements specified in Section 03300.

3.10 INSPECTION

- A. The Engineer shall be notified when the forms are complete and ready for inspection at least thirty-six hours prior to the proposed concrete placement.

- B. Failure of the forms to comply with the requirements specified herein, or to produce concrete complying with requirements of these Specifications, shall be grounds for rejection of that portion of the concrete work. Rejected work shall be repaired or replaced at no additional cost to the Owner. Such repair or replacement shall be subject to the requirements of these Specifications and approval of the Engineer.

END OF SECTION

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SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Reinforcing Steel Bars
 - 2. Welded Wire Fabric
 - 3. Reinforcing Accessories
- B. Related Sections
 - 1. Section 03100 - Concrete Forms and Accessories
 - 2. Section 03300 - Cast-in-Place Concrete

1.2 REFERENCES

- A. The Massachusetts State Building Code, latest edition.
- B. American Concrete Institute (ACI)
 - 1. ACI 117 - Standard Tolerance for Concrete Construction and Materials
 - 2. ACI 301 - Specifications for Structural Concrete for Buildings
 - 3. ACI 315 - Details and Detailing of Concrete Reinforcement
 - 4. ACI 318 - Building Code Requirements for Reinforced Concrete, American Concrete Institute
 - 5. ACI 350R - Environmental Engineering Concrete Structures
 - 6. ACI SP-66 - Detailing Manual
- C. American Society for Testing and Materials (ASTM)
 - 1. A185 - Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
 - 2. A615 - Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement
 - 3. A675 - Specifications for Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties
- D. American Welding Society (AWS)
 - 1. D1.4 Structural Welding Code - Reinforcing Steel
- E. Concrete Reinforcing Steel Institute (CRSI)
 - 1. CRSI 63 - Recommended Practice for Placing Reinforcing Bars

2. CRSI 65 - Recommended Practice for Placing Bar Supports, specifications and nomenclature

1.3 SUBMITTALS

- A. Provide shop drawings in accordance with the recommendations of ACI 315, "Details and Detailing of Concrete Reinforcement" and show the following: elevations, dimensions of concrete work with specified reinforcement clearances; ledges, brackets, openings, sleeves or other items furnished by other Sections, where interference with reinforcement may occur; bending diagrams; assembly diagrams; splices and laps of reinforcement; temperature and shrinkage reinforcement; construction joint reinforcement and shape; dimensions, grade designations, and details of reinforcement and accessories. Show dowels with concrete work to be placed first. Shop drawings shall be drawn to scale.
- B. Bar Bending Details - The bars shall be referenced to the same identification marks shown on the placement drawings. Bars to have special coatings and/or to be of special steel or special yield strength are to be clearly identified.
- C. Prior to delivery of reinforcing steel or concrete to job site, submit certified mill test reports of reinforcing steel and cement (including names and locations of mills and shops, and analyses of chemical and physical properties), properly correlated to concrete to be used in this project.

1.4 DELIVERY, HANDLING AND STORAGE

- A. Reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.
- B. Reinforcing steel shall be covered and stored off the ground, protected from moisture, and kept free from dirt, oil, or other foreign matter.

PART 2 PRODUCTS

2.1 REINFORCING STEEL BARS

- A. Reinforcing steel bars shall be newly rolled billet steel conforming to ASTM A615, Grade 60.
- B. Minimum yield strength shall be 60,000 psi.
- C. Where reinforcing steel bars are called for to be grouted into existing concrete, the anchorage shall develop an allowable bond strength equal to 24,000 psi times the cross section area of the bar, or an ultimate strength equal to the tensile strength of the bar.
 1. For installations in non-submerged concrete with an ambient temperature greater than or equal to 40 degrees Fahrenheit, the epoxy adhesive shall be, Hilti HIT_HY 200, Simpson SET-XP, Powers PE 1000+ or approved equal.
 2. For installation in wet or submerged concrete with an ambient temperature greater than or equal to 40 degrees Fahrenheit, the epoxy adhesive shall be Hilti HIT RE-500SD, Simpson ET-HP, Powers Pure 110+ or approved equal.
 3. For installation in concrete below 45 degrees Fahrenheit the epoxy adhesive shall be Hilti HIT ICE, Simpson AT-XP or equal.

2.2 WELDED WIRE FABRIC

- A. Welded wire fabric shall conform to ASTM A185

2.3 REINFORCEMENT ACCESSORIES

- A. Reinforcement accessories shall conform to Product Standard PS7-766, National Bureau of Standards, Department of commerce, Class C, as produced by Dayton Superior Corporation; R.K.L. Building Specialties Co., Inc. or equal approved by the Engineer.
- B. Reinforcement accessories shall include spacers, chair ties, slab bolsters, clips, chair bars, and other devices for properly assembling, placing, spacing, supporting, and fastening reinforcement.
- C. Tie wire shall be of sufficient strength for all intended purpose, but not less than No. 18 gauge. Metal supports shall be of such type as not to penetrate surface of formwork and show through surface of concrete.
- D. Accessories touching interior formed surfaces exposed to view shall have not less than 1/8 inch of plastic between metal and concrete surface. Plastic tips shall extend not less than 1/2 inch up on metal legs.
- E. Individual and continuous slab bolsters and chairs shall be of type to suit various conditions encountered and must be capable of supporting 300 pound load without damage or permanent distortion.
- F. Expansion Joint Dowels
 - 1. Dowels shall conform to ASTM A675.
 - 2. Expansion dowel caps shall be No. 87 dowel caps as manufactured by Heck Building Products, Inc., Type F-46 dowel caps as manufactured by the Dayton Sure-Grip and Shore Company, or equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Review all work prepared by others to receive work of this Section. Commencement of work will be construed as complete acceptance of preparatory work by others.

3.2 PREPARATION

- A. Notify the Engineer prior to the start of any phase of the reinforcing work so as to provide the opportunity to inspect the work. Such notification shall be made at least 24 hours in advance of reinforcement placements and at least 36 hours in advance of other inspections (forms, etc.).

3.3 REINFORCING BAR FABRICATION

- A. Fabrication of reinforcement shall be in accordance with the recommendations of CRSI.
- B. Reinforcing bars shall be cold bent and shall not be straightened or re-bent. Bars shall not be field bent unless approved by the Engineer.
- C. Reinforcing bars shall be bent around a revolving collar having a diameter of not less than that recommended by the CRSI.

- D. Reinforcing bar ends that are to be butt spliced or threaded, shall have the applicable end saw-cut. Such ends shall terminate in flat surfaces at a right angle to the axis of the bar.
- E. Where reinforcing bars are called for to be welded, the welding shall conform to AWS D1.4 Structural Welding Code - Reinforcing Steel.

3.4 INSTALLATION

- A. Reinforcement shall be placed in accordance with requirements of CRSI -63 - "Recommended Practice for Placing Reinforcing Bars" and CRSI 65, "Recommended Practice for Placing Bar Supports" and with further requirements below.
- B. Reinforcement shall be accurately placed in accordance with Contract Documents and shall be firmly secured in position by wire ties, chairs, spacers, and hangers, each of type approved by the Engineer. For slabs, grade beams, etc. where concrete is poured on grade, use additional setup bars and concrete brick to provide required cover over reinforcement.
- C. Bending, welding or cutting reinforcement in field in any manner other than as shown on Drawings, is prohibited, unless specific approval for each case is given by the Engineer.
- D. Reinforcement shall be continuous through construction joints unless otherwise indicated on Drawings.
- E. Reinforcement shall be spliced only in accordance with requirements of Contract Documents or as otherwise specifically approved. Splices of reinforcement at points of maximum stress shall generally be avoided.
- F. Welded wire fabric shall lap 6 inches or one space plus 2 inches whichever is larger, and shall be wired together. Provide No. 4 set up bars spaced 30 inches on center for slabs-on-grade or elevated slabs with composite decks.
- G. Proceed with installation of embedded items, and reinforcement, but do not place concrete into or around such items until the Engineer has approved work.

3.5 FIELD QUALITY CONTROL

- A. The Engineer shall have the right to postpone or stop concrete operations when in his judgment, reinforcement and embedded item installation has not been properly completed or the quality of construction will impair strength and durability or desired finished product. Costs arising from delays due to noncompliance will not be considered.
- B. Any material or workmanship that is rejected, either at the batch plant or at the site, shall be replaced promptly at no additional cost to the Owner.
- C. Before concrete is placed, reinforcement shall be free of excessive rust, dirt, oil, scale or other foreign matter that will destroy or reduce bond requirements. Reinforcement expected to be exposed to weather for a considerable length of time shall be painted with a heavy coat of cement grout. Protect stored materials so as not to bend or distort bars in any way. Bars that become damaged will be rejected.
- D. Before concrete is placed, check all installed reinforcement to ensure that it conforms to Contract Documents and approved Shop Drawings. Such checking shall be done

only by qualified experienced personnel. In addition, the Engineer shall be notified at least 36 hours prior to concrete placement and given opportunity to inspect completed reinforcement. Prior approval of Shop Drawings shall in no way limit the Engineer's right to require modifications or additions to reinforcement or accessories.

- E. Expansion joint dowels must be straight and clean, free of loose flaky rust and loose scale. Dowels may be sheared to length provided deformation from true shape caused by shearing does not exceed 0.04 inches on the diameter of the dowel and extends no more than 0.04 inches from the end. Bars shall be coated with a bond breaker on the expansion end of the dowel. Expansion caps shall be provided on the expansion end.

3.6 ADJUSTING

- A. Carry out corrections without delay as directed by the Engineer when construction operations indicate that requirements of Contract Documents or prudent construction practices are being or are about to be violated.

END OF SECTION

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Concrete Materials
2. Admixtures
3. Concrete Mix
4. Miscellaneous Concrete Materials

B. RELATED SECTIONS

1. Section 03100 - Concrete Forms and Accessories

1.2 REFERENCES

A. The Massachusetts State Building Code, latest edition

B. American Concrete Institute (ACI)

1. ACI 301-95 - Specifications for Structural Concrete for Buildings, (included as part of this specification)
2. ACI 305 - Hot Weather Concreting
3. ACI 306.1-90 - Standard Specifications for Cold Weather Concreting
4. ACI 318-02 - Building Code Requirements for Reinforced Concrete", American Concrete Institute

C. American Society for Testing and Materials (ASTM)

1. C33 – Standard Specification for Concrete Aggregates
2. C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
3. C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
4. C42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
5. C87 - Standard Test Method for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
6. C94 - Standard Specification for Ready-Mixed Concrete
7. C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

8. C150 – Standard Specification for Portland Cement
9. C260 - Standard Specification for Air-Entraining Admixtures for Concrete
10. C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
11. C494 - Standard Specification for Chemical Admixtures for Concrete
12. C535 - Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
13. C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
14. C685 – Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
15. C881 – Standard Specification for Epoxy-Resin Base Bonding Systems for Concrete
16. C989 – Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
17. C1059 – Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete

1.3 SUBMITTALS

- A. Submit concrete mix proposed for use, indicating design strength, supplier, batch quantities, and constituents. Provide test report copies indicating prior satisfactory performance in accordance with ACI 301.
- B. Submit data and descriptive literature for concrete constituents including admixtures, aggregate tests, bond breaker, bonding agent, and repair grout.
- C. Submit detailed methods proposed for curing and protection of concrete. This submittal shall be made not less than 10 days prior to the placement of any concrete.
- D. Submit a truck load ticket for every concrete delivery. Ticket information shall include batch time and date, weights of all constituents, quantity of admixtures, water added at the batch plant and moisture content of coarse and fine aggregates.
- E. Maintain an accurate daily record of the locations and quantity of concrete placed.

1.4 QUALITY ASSURANCE

- A. Provide inspection of cast-in-place concrete work, and testing, including slump tests, air content, and standard compression testing. Materials and workmanship shall be subjected to inspection and testing in mill, shop and/or field by the Engineer. Such inspection and testing shall not relieve Contractor of his responsibility to provide his own inspection, testing, and quality control as necessary to furnish materials and workmanship in accordance with requirements of this Section.
- B. Provide notification prior to the start of any phase of concrete placement work so as to provide the opportunity to inspect the work. Such notification shall be made at

least 24 hours in advance of concrete placements and at least 36 hours in advance of other inspections (forms, rebar, etc.).

- C. Facilitate inspection and testing, and furnish the following:
1. Safe access to the work at all times to allow proper inspection of the work
 2. Full and ample means and assistance for sampling and testing materials and proper facilities for inspection of work in plant and at project site
 3. Covered box large enough to contain twenty-four standard concrete cylinders. At temperatures below 60°F, box shall be electrically heated and thermostatically controlled to maintain inside temperature of 60° to 80°F. Cylinders shall be placed in box immediately after molding and shall be covered with moist burlap until delivery to laboratory, 24 to 72 hours after molding.
 4. Access by the Engineer or his representative to the batch plant supplying the concrete at any time.
- D. Compression tests shall consist of one set of 4 cylinders for each test made, cured, and tested by testing laboratories during progress of job. 6 cylinders shall be required for each test made with concrete mix containing fly ash or ground granulated blast furnace slag. One set of cylinders shall be taken for every 100 cubic yards of concrete or fraction thereof placed in any one day.
1. 1 cylinder of each set shall be tested for 7-day compressive strength; 2 cylinders shall be tested for 28-day compressive strength. The remaining cylinder shall be tested for 56-day compressive strength if either one of the 28-day tests are below the specified strength, otherwise the 56-day test will be eliminated.
 2. For modified mix with fly ash or ground granulated blast furnace slag, 1 cylinder of each set shall be tested for 7-day compressive strength, 2 cylinders shall be tested for 28-day compressive strength and 2 cylinders shall be tested for 56-days compressive strength. The remaining cylinder shall be tested for 84-day compressive strength if either one of the 56-day tests are below the specified strength, otherwise the 84-day test will be eliminated.
 3. The Contractor will provide and pay for the services of an approved testing laboratory to test the cylinders. Compression strength test of cylinders shall conform to ASTM C39, latest revision. The cost of all testing work under this Section will be borne by the Contractor. The testing laboratory will submit certified copies of the test results directly to the Engineer and the Contractor within 24 hours after tests are made.
 4. Sampling, molding, curing and testing of cylinders shall conform to ASTM requirements. Specimens shall be cured under laboratory conditions. The Engineer may require additional cylinders to be cured under field conditions when unusual conditions may tend to reduce concrete strength.
 5. Report of tests shall include: name of project, date and location of concrete placement, design strength of concrete, mix data, slump, air content (if tested), compressive strength, age and condition of test cylinder, type of fracture, and type of curing.

- E. Slump test, to check consistency, shall be made from the sample used to mold cylinders. Additional slump tests may be taken of every batch delivered to job site.
- F. Tests for determination of air content shall be made as required to verify conformance with the specifications.
- G. The strength level of the concrete mix shall be considered satisfactory if both of the following criteria are satisfied:
 - 1. Every arithmetic average of any three consecutive strength tests equals or exceeds the specified design strength.
 - 2. No individual strength test (average of two cylinders from the same test group) falls below the specified design strength by more than 500 psi when the specified design strength is 5000 psi or less or by more than 10 percent of the specified design strength when the design strength is more than 5000 psi.
- H. When tests of control specimens fall below these requirements, the Engineer will require 56 day or 84 day cylinder tests or core specimens taken from concrete in question and tested in accordance with ASTM C42. If these specimens do not meet strength requirements, the Engineer has the right to require additional curing, load tests, strengthening or removal and replacement of those parts of the structure which are unacceptable, and in addition, removal of such sound portions of structure as necessary to ensure safety, appearance, and durability of structure. Additional testing, load tests, strengthening or removal and replacement of parts or structure and any costs associated with delay of project shall be at no additional cost to the Owner.
- I. Any material or workmanship which is rejected, either at the batch plant or at the site, shall be replaced promptly at no additional cost to the Owner.
- J. If arrangements for corrections and/or replacements are not made within seven days after notice of rejection, the Owner has the right to have corrections and/or replacement made and charge cost thereof and any costs associated with delay of project against balance of monies withheld.
- K. Acceptance of work and admixtures at the batch plant shall not prevent final rejection at job site upon arrival or after it has been installed, if work is found to be defective.
- L. Portions of a structure which do not meet the requirements of the Contract Documents based on appearance or for any other aesthetic reason, shall be corrected or removed and replaced at no additional cost to the Owner.
- M. Work on new concrete structures shall conform to the requirements of ACI 306.1, Standard Specifications for Cold Weather Concreting, except as modified herein.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: shall be American-made Portland Cement, free from water soluble salts or alkalis which will cause efflorescence on exposed surfaces. Portland Cement shall be Type II, ASTM C150. Air entraining cements are prohibited.
- B. Pozzolans and Blast Furnace Slag
 - 1. Fly Ash: Class F conforming to the requirements of ASTM C618.

2. Ground Granulated Iron Blast-Furnace Slag: Conforming to ASTM C989.
- C. Normal weight Fine Aggregate
1. Washed, inert, natural sand conforming to ASTM C33 and the following additional requirements.
 - a. Fineness Modulus 2.75 (plus/minus 0.25)
 - b. Clay lumps and friable particles – 3.0 percent maximum
 - c. Coal and lignite – 0.5 percent maximum
 - d. Organic Impurities (ASTM C40) – Organic Plate No. 2
 - e. Strength of Mortar (ASTM C87) – not less than 95 percent at 7 days
 - f. Soundness (AASHTO T-104) - 10 percent maximum loss (magnesium sulfate solution, five cycles)
- D. Normal weight Coarse Aggregate
1. Well graded crushed stone or washed gravel conforming to ASTM C33 and the following additional requirements:
 - a. Material finer than No. 200 sieve – 1.0 percent maximum
 - b. Clay lumps and friable particles – 2.0 percent maximum
 - c. Chert (less than 2.40 specific gravity, saturated surface dry) – 3.0 percent maximum by weight.
 - d. Sum of clay lumps, friable particles, and chert (less than 2.40 specific gravity, saturated surface dry) – 3.0 percent maximum by weight. This limitation only applies to aggregates in which chert appears as an impurity.
 - e. Coal and lignite – 0.5 percent maximum
 - f. Soundness - 18 percent maximum loss (magnesium sulfate solution, five cycles)
 - g. Soundness - 10 percent maximum loss (sodium sulfate solution, five cycles)
 2. Coarse aggregates shall not exceed 35% by weight "percentage of wear" as determined by the Los Angeles Abrasion and Impact Tests in ASTM C131 and C535.
- E. Water shall be from approved source, potable, clean and free from oils, acids, alkali, organic matter and other deleterious material.

2.2 ADMIXTURES

- A. Water-reducing agent:
1. Water-reducing agent shall be by same manufacturer as air-entraining agent.
 2. Daracem - 55 W.R. Grace & Co.

3. Pozzolith 220N – BASF Admixtures, Inc.
 4. Eucon MR - Euclid Chemical Co.
 5. Or equal conforming to ASTM C494 Type A.
- B. Air-entraining agent:
1. DAREX AEA - W.R. Grace & Co.
 2. MB-VR or MB-AE90 - BASF Admixtures, Inc.
 3. Air-Mix - Euclid Chemical Co.
 4. Or equal conforming to ASTM C260.
- C. Admixtures which retard setting of cement in concrete shall not be used without written approval of the Engineer. Admixtures causing accelerated setting of cement in concrete shall not be used.

2.3 CONCRETE MIX

- A. Select proportions of ingredients to meet the design strength and materials limits specified and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportioning shall also conform to the requirements in ACI 301 and ACI 318.
- B. The concrete mix design shall be a 4000 psi compressive strength concrete using $\frac{3}{4}$ inch aggregate. The design mix shall be selected based on previous test records for a mix with essentially the same proportions, and shall meet the following limiting values in Table A:

TABLE A
Maximum Allowable Water/Cement Ratios

Minimum Allowable 28 day Compressive Strength (psi)	Maximum Allowable Water/Cement Ratio	Total Cementitious Material (Pounds)	
		Min	Max
4000	0.45	611	635

- C. If sufficient test records are not available, (at least 30 consecutive strength tests or two groups of tests totaling at least 30 within the past 12 months), the design mix shall be developed using laboratory trial mixtures in accordance with ACI 301.
- D. All concrete is normal weight with air-dry weight not to exceed 150 lbs. per cubic foot.
- E. Fly ash may be substituted for up to 20 percent by weight of the total cementitious material. Ground granulated iron blast-furnace slag may be substituted for up to 40 percent by weight of the total cementitious material.
- F. For concrete flatwork with a steel trowel finish, fly ash may be substituted for up to 10 percent by weight and ground granulated iron blast-furnace slag may be substituted for up to 25 percent by weight of the total cementitious material.

- G. All concrete shall contain the approved air-entraining admixture as per manufacturer's written instructions to provide entrained air by volume in the cured concrete between 4.5 and 7.5%.
- H. The design mix shall meet the following slump limiting values in Table B:

TABLE B
Concrete Slump¹

Portion of Structure	Recommended (inches)	Maximum Range (inches)
Mats	2	2-3
Walls, Column, Beams	4	3-5
Slabs	3	2-4

¹After addition of high range water reducer

- I. The approved water-reducing admixture shall be used in all concrete, in accordance with manufacturer's written instructions.

2.4 MISCELLANEOUS MATERIALS

- A. Grout shall be a ready-to-use, non-metallic, non-shrink aggregate product requiring only the addition of water at the job site. Grout shall be as manufactured by Five Star Products, Inc.; Euclid Chemical Company; Master Builders; or equal. Grout shall be easily workable and shall have no drying shrinkage at any age. Compressive strength of grout (2 inch by 2 inch cubes) shall not be less than 5000 psi at 7 days, and 7500 psi at 28 days.
- B. Floor Hardener, Sealer, and Waterproofing Treatment:
1. Concrete floor surfaces not covered with resilient flooring or carpet shall receive a surface treatment after steel trowel finishing.
 2. Product and Manufacturer:
 - a. Ashford Formula hardener and sealer as manufactured by Concrete Chemical Company, Inc., Springville, Utah
 - b. Seal Hard concrete sealer as manufactured by L&M Construction Chemicals, Inc., Omaha, Nebraska
 - c. Approved equal
- C. Concrete Construction Joint Roughener:
1. Provide a water soluble non-flammable, surface-retardant roughener.
 2. Product and Manufacturer:
 - a. Rugasol-S by Sika Corporation for horizontal joints only
 - b. Tuf-Cote (Deep Etch) by Preco Industries Ltd. for vertical joints
 - c. Approval equal

D. Bond Breaker:

1. Provide an adhesive-backed glazed butyl or polyethylene tape which will satisfactorily adhere to the premolded joint filler or concrete surface as required. The tape shall be the same width as the joint.
2. Bond breaker for concrete other than where tape is specifically called for shall be either bond breaker tape or an ASTM C309 non-staining type bond prevention coating such as Masterkure 100WB by Degussa Construction Chemicals, Super Bondbreaker VOC or Super Bondbreaker WB by Edoco Burke Construction Chemicals, Tilt-Eez VOC or Tilt-Eez WB by Conspec Marketing & Manufacturing or equal.

E. Bonding Agent:

1. Provide a two-component, 100% solids, moisture –tolerant structural epoxy adhesive conforming to ASTM C881, Type II. The bonding agent shall be Sikadur 32 Hi-Mod by Sika Corporation of Lyndhurst, NJ, Concrecive Liquid (LPL) by Degussa Admixtures, Inc. of Cleveland, OH or equal.
2. Latex bonding agent shall be a non-remulsifiable acrylic-polymer latex conforming to ASTM C1059 Type II.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify cover requirements over all reinforcement.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- C. Verify site conditions to insure that full access is available for placement of concrete.

3.2 JOINTS

- A. Construction and expansion joints indicated on Drawings are mandatory and shall not be omitted. Construction joints shall conform to the requirements of Section 03100 and the following:
 1. Before placing new concrete against concrete already in place and hardened, the surface shall again be cleaned with a jet where practical. The exposed aggregate shall then be mopped with a mortar composed of the same proportions of sand and placed and mopped in place immediately prior to the placing of concrete and shall not have set up or hardened prior to the placing of concrete.
 2. Where joints other than those shown are required, they shall be made at such locations as the Engineer may allow, and shall in no case impair the structural strength of the structure.
- B. Joints not indicated or specified shall be placed to least impair strength of structure and shall be subject to approval of the Engineer.

- C. Saw-cut joints shall be installed in the locations shown on the Drawings. Saw-cut joints shall not be substituted for formed construction joints unless approved by the Engineer. Saw-cut joints shall conform to the following requirements:
1. The depth of the saw cut shall be at least $\frac{1}{4}$ of the slab thickness or a minimum depth of one inch unless otherwise shown on the Drawings.
 2. Do not saw cut through slab reinforcing steel unless directed to do so in writing by the Engineer.
 3. Joints produced using conventional wet-cut process shall be completed within 4 to 12 hours after the slab has been finished - 4 hours in hot weather conditions and 12 hours in cold weather conditions.
 4. Joints produced using the early-entry dry cut process shall be formed using diamond-impregnated blades and shall be completed within 1 to 4 hours after the slab has been finished - 1 hour in hot weather conditions and 4 hours in cold weather conditions. The maximum depth of joints produced by the dry cut process shall not exceed 1-1/4 inches. Care should be taken to make sure that the saw does not ride up over large or hard coarse aggregates.
 5. Regardless of the saw cutting process chosen, the saw cutting must be performed before the concrete starts to cool, as soon as the concrete surface is firm enough not to be torn or damaged by the cutting blade, and before random-drying-shrinkage cracks can form in the concrete slab.

3.3 MIXING, CONSISTENCY, AND DELIVERY OF CONCRETE

- A. Concrete shall be ready-mixed, produced by a central batch plant. Hand or site mixing shall not be allowed. Constituents, including admixtures, shall be batched at the central batch plant. Admixtures shall be premixed in solution form and dispensed as recommended by the manufacturer.
- B. Central plant and rolling stock equipment and methods shall conform to Truck Mixer and Agitator Standard of Truck Mixer Manufacturer's National Ready-Mixed Concrete Association, ASTM C94, ASTM C685, and Contract Documents. Consistency of concrete at time of placement shall be at a 3 inch slump, +/- 1 inch.
- C. Ready mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities. Discharge at site shall be within one and one-half hours after cement is first introduced into the aggregates. Concrete with a temperature greater than 90°F. shall be rejected and removed from the site.
- D. During any of the following conditions: high ambient temperature, high concrete temperature, low relative humidity, increased wind velocity, high solar radiation, when the temperature of the concrete is 85°F or above, the time between the introduction of cement to the aggregates and discharge shall not exceed one hour. In addition, when the rate of evaporation on the surface of the concrete is expected to approach 0.2 lb/ft²/hr. (see chart in ACI 305R) special precautions shall be taken against the formation of plastic shrinkage cracking on the surface of the concrete after placement.

- E. During any period when for more than three successive days the average daily outdoor temperature drops below 40°F, the concrete temperature at the time of placement shall be as specified in Table C below.

TABLE C

Concrete Temperature During Cold Weather

Least dimension of section, inches.	Minimum temperature of concrete as placed and maintained during the protection period, °F	Maximum gradual decrease in surface temperature during any 24 hours after end of protection, °F
Less than 12	55	50
12 to less than 36	50	40
36 to 72	45	30
Greater than 72	40	20

- F. Central mixed concrete shall be plant mixed a minimum of five minutes. Agitation shall begin immediately after premixed concrete is placed in truck and shall continue without interruption until discharged. Transit mixed concrete shall be mixed at mixing speed for at least ten minutes immediately after charging truck followed by agitation without interruption until discharged.
- G. Retempering of concrete which has partially hardened by mixing with or without additional cement, aggregates, or water shall not be permitted.

3.4 PLACING CONCRETE

- A. Remove excess water and foreign matter from forms and excavations. Do not place concrete on frozen soil. Provide adequate protection against frost action during freezing weather.
- B. Transport concrete from mixer to place of final deposit as rapidly as practical by methods which prevent separation of ingredients and displacement of reinforcements, and which avoid re-handling. Do not deposit partially hardened concrete. When concrete is conveyed by chutes, equipment shall be of such size and shape to ensure continuous flow in chute. Flat (coal) chutes shall not be used. Chutes shall be of metal or metal lined and uniformly sloped. Slope shall not be less than 25° nor more than 45° from horizontal. Concrete shall be lowered and maintained as near to the surface of deposit as practicable. The chute shall be thoroughly cleaned before and after each use and debris and any water shall be discharged outside of the forms. Concrete shall not be allowed to flow horizontally over distances exceeding 10 feet or dropped vertically over 6 feet.
- C. Place concrete in such a manner as to prevent segregation and accumulations of hardened concrete on forms or reinforcement above the grade of concrete being placed. Suitable hoppers and spouts with restricted outlets and tremies shall be used as required.
- D. Thoroughly consolidate each layer of concrete by rodding and vibrating using internal type mechanical vibrator. Vibration shall be done by experienced operators under close supervision and shall be carried on only enough to produce homogeneity and

optimum consolidation without permitting segregation of constituents or "pumping" of air. Vibrators used for normal weight concrete shall operate at speeds of not less than 7,000 vpm and be of suitable capacity. Do not use vibrators to move concrete. Vibration shall be supplemented by spading to remove bubbles and honeycombs adjacent to visible surfaces. At least one vibrator shall be on hand for every 10 cubic yards of concrete placed per hour, plus one spare. Vibrators shall be operable and on site prior to starting concrete placement.

- E. Deposit concrete continuously, and in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause formation of seams and planes of weakness within the section. If a section cannot be placed continuously between planned construction joints, as specified, field joints and additional reinforcement shall be introduced at the Contractor's expense to preserve structural continuity.
- F. Cold joints, particularly in exposed concrete, including "honeycombs", are unacceptable. If they occur in concrete surfaces exposed to view, the Engineer will require that entire section in which blemish occurs be removed and replaced with new materials at the Contractor's expense.

3.5 CURING AND PROTECTION

- A. When concrete is placed at or below an ambient air temperature of 40°F. or whenever this temperature or lower values are likely to occur within 48 hours after placement of concrete, cold weather concreting procedures, according to ACI 306.1 and as specified herein, shall be followed. The entire area affected shall be protected by adequate housing or covering, and heating. No salt, chemicals or other foreign materials shall be used in the mix to lower the freezing point of concrete. No oil or kerosene heaters shall be utilized. Vent flue gases from combustion heating units to the outside of the enclosure.
- B. No frozen materials shall be used in batching concrete and any ice shall be removed from coming into contact with the concrete.
- C. Protect concrete work against injury from heat, cold, and defacement of any nature during construction operations.
- D. Concrete shall be treated and protected immediately after concreting or cement finishing is completed, to provide continuous moist curing above 50°F. for at least 7 days, regardless of ambient air temperatures.
- E. All concrete shall be cured immediately after finishing in accordance with the following requirements:
 - 1. Curing shall be accomplished by a continuous soaking process such as the use of soaker hose or sprinklers, or by use of plastic roll materials to cover the concrete, which shall be thoroughly wetted at least once a day or more often as required in very hot weather. Such plastic shall be placed as soon as possible after finishing of concrete so that scarring of the surface will not occur. Plastic shall be held in place on the surface of the concrete in such a manner and means as will not allow it to be blown off or otherwise dislodged from the concrete surface. Curing procedures shall be maintained continuously for a period of at least 7 days.

2. All methods of curing shall be subject to approval of the Engineer, and each method employed shall be practical and adequate for the curing required. Curing compounds in lieu of wet curing will not be allowed.
- F. Keep permanent temperature records showing date and outside temperature during concreting operations. Thermometer readings shall be taken at start of work in morning, at noon, and again late in afternoon. Locations of concrete placed during such periods shall likewise be recorded in such manner as to show any effect temperatures may have had on construction.

3.6 REMOVAL OF FORMWORK

- A. Forms shall not be removed until concrete has attained sufficient strength to support its own weight, construction loads to be placed thereon and lateral loads, without damage to structure or excessive deflection.
- B. With the exception of construction joint bulkheads and keyways, forms and supports shall remain in place for not less than the minimum time periods noted below.
1. Unless specifically authorized by the Engineer, forms for vertical surfaces shall not be removed before the concrete has attained a strength of not less than 30 percent of the minimum allowable prescribed compressive strength nor not less than the minimum time period specified in Table D.
 2. Unless specifically authorized by the Engineer, forms for horizontal surfaces shall not be removed before the concrete has attained a strength of not less than 60 percent of the minimum allowable prescribed compressive strength nor not less than the minimum time period specified in Table D.

TABLE D

Minimum Degree Day Requirement for Form Removal

Form Use	Degree-Days
Walls and Vertical Surfaces	200
Elevated Slabs	400
Beams and Girders	600

3. Definition of degree-days - Total number of days times mean daily air temperature at the surface of the concrete. For example, 5 days at temperature of 60°F. equals 300 degree-days. Days or fractions of days in which temperature is below 50°F. shall not be included in calculation of degree-days except where modified by Table C above.
- C. Forms for construction joint bulkheads and keyways may be removed the following day, after the concrete pour. Extreme caution must be used to avoid damage to the concrete surface and keyway.
- D. Any test cylinders required to verify the specified minimum strengths for form removal shall be field cured under the same conditions as the concrete they represent. Such cylinders and testing shall be at the Contractor's expense.

3.7 FINISHING OF CAST-IN-PLACE CONCRETE

A. Upper Horizontal Surfaces

1. Horizontal surfaces not subjected to wear, such as tops of parapets, copings, walls, etc., shall be formed by placing an excess of material in the forms and removing or striking off such excess with a template, forcing the coarse aggregate below the surface of the mortar.
2. Horizontal surfaces shall be attained by striking off excess concrete and in no case shall concrete be added to the tops of walls, etc., once initial set has taken place.
3. The top of such surfaces shall be finished in a manner as required and dictated by the necessary appearance of the part being finished. For covered surfaces, a wood float finish will in most cases be sufficient. Steel troweling may be necessary where concrete is exposed to view and adjacent surfaces have a steel trowel finish. In other cases, a "broom" finish may be required.

B. Slab Surfaces

1. Interior traffic bearing surfaces shall have a steel trowel finish and exterior slabs shall have a wood or magnesium trowel non-slip finish. The finish shall be accomplished by a procedure as follows, but shall be the Contractor's responsibility to produce a good and proper finish on all parts of the work:
 - a. "Steel Trowel Finish" - The surface shall be screeded and given a minimum of two trowelings using a steel trowel. The final troweling shall be done at a time when the concrete has set to a point where troweling produces a ringing sound as the trowel is drawn across the surface. Where surface areas are large enough to permit their use, power finishing machines will be used. For all steel trowel finishes, a fine textured dense surface shall be the final result. Premature finishing will require additional troweling to obtain the final result.
 - b. "Wood Float Finish" - The surface shall be screeded, given a minimum of one steel troweling and shall then be finished with a wood, cork or other float as required to produce the desired finish. In cases where a rough wood float finish is sufficient, the above procedure may be executed, omitting the steel troweling. A wood float finish shall be used only when allowed in writing by the Engineer.
 - c. "Broom Finish" - On exterior work such as sidewalks and where else called for, a broom finish shall be used. The finishing shall be accomplished in the following manner. Screeding shall be done and the surface worked up with a wood float. At a proper time thereafter, the surface shall be steel troweled at least once and more if so directed. Upon completion of troweling, a sufficiently stiff bristled broom shall be drawn lightly across the surface to produce a slightly striated finish. The brooming shall in general be perpendicular to the main traffic route. Coordinate required finish with the Engineer before application.
2. For all of the finishing procedures described, the time element is important and something that must be determined during the progress of the work as conditions warrant. Normally, free water on the surface of concrete should not

occur. Allow the concrete surface to dry before starting finishing operations. Do not, under any circumstance, add dry cement to wet areas in order to accelerate drying. Finishing and rubbing required for all parts of the work shall be done only by competent "Cement Finishers" trained for the work.

C. Formed Surfaces

1. Immediately after the end of the wet cure period, remove form ties and patch all tie-holes, rat holes, and other surface voids with a non-metallic, non-shrink grout, which most nearly matches the color and texture of the concrete surface. All protrusions shall be ground smooth with an approved mechanical grinder.

3.8 REPAIRING OF HARDENED CONCRETE SURFACES

- A. Defective concrete and honeycombed areas shall not be patched unless examined and approval is given by the Engineer. After approval, areas involved shall be cut back to a minimum depth of 1 inch from the finished surface, or as otherwise directed, whichever is greater. Edges of areas to be repaired shall be cut square to a minimum depth of 3/4 inch. Feathered edges will not be allowed. Any voids or honeycomb around reinforcing steel shall be chipped away to provide at least 3/4 inch clearance all around to permit proper placement of repair concrete around the steel to the parent, sound concrete.
- B. Exposed surfaces shall be thoroughly cleaned of all mud, paint, grime, scum, laitance, organic matter, detritus, calcareous growth and other foreign matter by sand and water blasting or other acceptable means. Immediately after cleaning, the surface shall be checked by the Engineer for proper surface preparation, including fractured concrete or loose aggregate. Any such material shall be removed using pneumatic or hand tools. The final surfaces shall be thoroughly rinsed with clean water to remove remaining dirt and dust.
- C. Premoisten the prepared surface for at least 2 hours to reduce the absorption of water by the parent concrete and to provide a reservoir for moist curing at the interface of the repair. The substrate should be saturated surface dry with no standing water. While the concrete surface is still damp, apply a thin 1/16 inch coat of neat cement slurry (mixed to the consistency of a heavy paste) with a bristle brush to provide a bond coat throughout the entire cavity of the repair. Before the slurry has dried or changed color, promptly install the repair concrete or dry-pack, as may be required or selected.
- D. For relatively small areas, ram repair concrete into this portion of the formed void. This concrete shall comprise a crumbly-dry 1-1-1.5 mixture of cement, concrete sand and pea gravel (or 3/4 inch gravel) mixed slightly damp to the touch (just short of "balling"). The "dry-pack" consistency of the concrete shall be zero slumps, but moist enough so that when it is rodded and tamped until dense, an excess of paste will appear on the surface in the form of a spider web. In cases of unformed voids of thinner section, do not build-up repair in excess of a depth which will sag with the weight of the fresh mortar or concrete. Trowel smooth with heavy pressure.
- E. The concrete shall be of the driest possible consistency and mix composition so that it can be worked into the corners and angles of forms and around the reinforcement, without permitting the materials to segregate or free water to collect on the surface,

due consideration being given to the methods of placing and compacting. Source and mixture of concrete shall be submitted for approval.

- F. Concrete shall be deposited continuously, or in layers of such thickness that no concrete will be deposited which has hardened sufficiently to cause the formation of seams and planes of weakness within the section. Concrete shall be thoroughly consolidated and trowelled dense, smooth and plane. Avoid premature and excessive trowelling which could cause sagging.
- G. Repair areas and adjacent parent concrete surfaces shall be continuously moist cured immediately after finishing for at least 7 days. Surfaces shall be covered with damp burlap and sealed with taped polyethylene. Membrane curing compounds shall not be used.
- H. Leave finished work and adjacent concrete surfaces in a neat, clean condition with no evidence of spillovers or staining.

3.9 CLEANING

- A. Concrete surfaces shall be cleaned of objectionable stains as determined by the Engineer. Materials containing acid in any form or methods which will damage the "skin" of concrete surfaces shall not be employed, except where otherwise specified.

END OF SECTION

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DIVISION 5 - METALS

SECTION 05500

MISCELLANEOUS METALS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aluminum component handrail systems.
 - 2. Decorative Metal Fence
 - 3. Fasteners for Miscellaneous Metals items.
- B. Related Sections
 - 1. Section 05050 – Welding.
 - 2. Section 09900 – Painting.

1.2 REFERENCES

- A. The Massachusetts State Building Code, latest edition
- B. The International Building Code (IBC), latest edition
- C. American Iron and Steel Institute (AISI), Stainless Steel Types
 - 1. AISI Type 316 - Stainless Steel Bolts, Bars, Sheets and Shapes
 - 2. AISI Type 316L - Stainless Steel Bars, Shapes, Plates and Pipe
- D. American National Standards Institute (ANSI)
- E. American Society for Testing and Materials (ASTM)
 - 1. A27, Standard Specification for Steel Casting, Carbon, for General Application
 - 2. A143, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedures for Detecting Embrittlement
 - 3. A148, Standard Specification for Steel Castings, High Strength, for Structural Purposes
 - 4. A193, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
 - 5. A194, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service
 - 6. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
 - 7. A490, Standard Specification for Structural bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength

8. A563, Standard Specification for Carbon and Alloy Steel Nuts
 9. A606, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
 10. F436, Standard Specification for Hardened Steel Washers
 11. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
 12. F594, Standard Specification for Stainless Steel Nuts
 13. F844, Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use
 14. F1554, Standard Specification for Anchor Bolts, Steel, 36-, 55-, and 105-ksi Yield Strength
 15. F1852, Standard Specification for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- F. International Conference of Building Officials (ICBO): Evaluation Reports for Concrete and Masonry Anchors.
- G. Occupational Safety and Health Administration (OSHA):
- H. National Association of Architectural Metal Manufacturers (NAAMM):
1. ANSI MBG 531, Metal Bar Grating Manual.
 2. ANSI MBG 532, Heavy-Duty Metal Bar Grating Manual.
- I. The Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.

1.3 SUBMITTALS

- A. Product Data:
1. Component Handrail and Fence Systems:
 - a. Manufacturer's product descriptions.
 - b. System installation and assembly instructions.
- B. Samples (when requested by the Engineer):
1. Aluminum handrail and steel fencing post and rail assemblies, finished as specified.

1.4 QUALITY ASSURANCE

- A. Shop Assembly: Pre-assemble items in shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- C. Qualifications for Welding Work: In accordance with the requirements of Section 05050.
- D. All handrails and grating, etc. shall comply with OSHA, ADA, and The Rhode Island State Building Code.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Handle and stack materials carefully to prevent deformation or damage.
- B. Store materials carefully on substantial timbers and blocking, so arranged that materials will be free from earth and properly drained, preventing any splattering with dirt or accumulation of water or snow in or about materials.
- C. Prevent accumulation of mud, dirt, or other foreign matter on materials. Any accumulation shall be completely removed prior to erection.
- D. Protect painted, hot-dip galvanized, and other finishes from damage due to metal banding and rough handling. Use padded slings and straps.

PART 2 PRODUCTS

2.0 AMERICAN IRON AND STEEL

- A. All iron and steel products included in this section shall be manufactured in the US.

2.1 MATERIALS

- A. Unless otherwise indicated, meet the following requirements:

Item	ASTM Reference
Steel	ASTM A 36, hot rolled structural quality steel
Stainless Steel:	
Bolts, Threaded Rods, Anchor Bolts, and Anchor Studs	F593, AISI Type 316
Nuts	F594, AISI Type 316
Aluminum:	
Extruded Shapes	B221, Alloy 6061, Temper T6
Aluminum Sheet	B209, Alloy 3003, Temper H14

Item	ASTM Reference
Steel Bolts and Nuts:	
Carbon Steel	A307 bolts, with A563 nuts
High-Strength	A325, Type 1 bolts, with A563 nuts A153 for galvanized components
Anchor Bolts and Rods	F1554, Grade 55, with weldability supplement S1
Eyebolts	A489
Threaded Rods	A36
Flat Washers (Unhardened)	F844
Flat and Beveled Washers (Hardened)	F436

2.2 MANUFACTURED UNITS

A. Aluminum Component Handrail Systems

1. All handrail systems shall be designed to resist a single concentrated load of 200lb in accordance with ASCE 7-10 specifications.
2. Aluminum component handrail system shall be as manufactured by Julius Blum or equal.
3. Railing system shall be fabricated from anodized aluminum pipe designation 6063-T52 meeting ASTM B241 with nominal size of 1½ inch (1.900 inch outside diameter) minimum schedule 40.
4. Posts shall be fabricated from anodized aluminum pipe designation 6063-T832 meeting ASTM B210 with a nominal size of 1½ inch, minimum schedule 80, with 1½ inch aluminum round rod, designation 6061-T6. The round rod shall be inserted into all pipe posts. Maximum post spacing shall be 3'-6" on center, unless otherwise approved in writing by the Engineer.
5. Railings shall be mounted utilizing bottom mount aluminum brackets or by embedment of posts into sleeves as shown on the contract drawings. Posts shall be mechanically fastened to brackets.
6. Fittings shall be of wrought aluminum material. Tee fittings and elbows that are fabricated from more than one piece shall be welded construction with no marks visible when the fitting is installed.
7. Internal connector sleeves shall be of extruded aluminum.
8. Mechanical fasteners shall be concealed stainless steel fasteners.

B. Decorative Metal Fence

1. All fence systems shall be designed to meet the minimum performance standards outlined in IBC 1015.2.

2. Pickets: Square Solid Bar, ASTM A 36, hot rolled structural quality steel, 60,000 psi tensile strength, psi yield strength. Size pickets - 3/4". Space pickets 3-15/16" maximum face to face. Attach each picket to each rail with 1/4" industrial drive rivets. Size 1" long.
3. Rails: "U" channels formed from hot-rolled structural steel having no pockets or shelves hold water or moisture, 1-3/8" wide x 1-1/2" deep, 11 gauge [0.120"] wall thickness. Punch rails to receive pickets and rivets and attach rails to rail product under ASTM A446.
4. Posts: Square tubular members, ASTM A500, hot-rolled structural quality steel, 60,000 psi tensile strength, 60,000 psi yield strength, with ASTM A525 hot dipped galvanized G90 coating
5. Finish: After all steel components have been galvanized, clean and prepare the surface of all components to assure complete adhesion of finish coat. Apply 2.5 mil (0.0635 mm) thickness of polyester resin based powder coating by electrostatic spray process. Bake finish for 20 minutes at 450°F (232°C) metal temperature. Ornamental fence shall be Black in color.

2.3 ACCESSORIES

- A. Aluminum Handrail Post Brackets: ASTM B221, Extruded Aluminum, Alloy 6061, as manufactured by Thompson Fabrication Company, R.B. Wagner, Julius Blum and Co. or equal.

2.4 FINISHES

- A. Aluminum Materials
 1. Finished contact surfaces, such as component handrail systems, shall be finished in accordance with the Aluminum Association designation AA-M32C22A41. Component handrail system color shall be Black.
- B. Steel Decorative Fencing
 1. Finish: After all steel components have been galvanized, clean and prepare the surface of all components to assure complete adhesion of finish coat. Apply 2.5 mil (0.0635 mm) thickness of polyester resin based powder coating by electrostatic spray process. Bake finish for 20 minutes at 450°F (232°C) metal temperature. Decorative fence shall be Black in color.

2.5 SOURCE QUALITY CONTROL

- A. Miscellaneous Metals fabrications, materials, and workmanship shall be subjected to inspection and testing in mill, shop and/or field by the Engineer.
- B. Maintain inspection and quality control records of shop and field work.
- C. Notify the Engineer prior to start of any fabrication, the start of sandblasting and painting, or other phases of work so as to afford them reasonable opportunity to inspect work.
- D. Do not remove any marks or tags identifying rejected work.

- E. Miscellaneous Metals work that has been rejected by the Engineer in the mill or shop shall be corrected without delay and at no expense to the Owner.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify that anchor bolts, bearing plates, and other items furnished to be installed by others have been installed correctly.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. All steel and aluminum surfaces to come in contact with exposed concrete or masonry shall receive a protective coating of an approved heavy bitumastic troweling applied in accordance with manufacturer's instructions prior to installation.

3.3 FIELD FABRICATION

- A. No fabricated section shall be cut in the field without the permission of the Engineer.
- B. All miscellaneous metals work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability.
- C. Connections and accessories shall be of sufficient strength to safely withstand stresses and strains to which they will be subjected. Accessories and connections to steel or cast iron shall be steel, unless otherwise specified. Threaded connections shall be made so that the threads are concealed by fittings.
- D. No splicing of any member or part of the work will be allowed where full-length members are commercially available. Jointing shall meet the approval of the Engineer.
- E. Screws, bolts, studs and other connecting devices required in the work shall be concealed wherever possible. On finish work where fasteners must be exposed to view, they shall be countersunk and finished flush with the exposed surfaces. Screws, bolts and other fastening devices used for exterior work shall be aluminum, bronze or stainless steel, whichever is appropriate for the work in which it is to be used.

3.4 INSTALLATION

- A. Install railings and fencing in accordance with the contract documents and manufacturer's recommendations.
- B. Railings and Handrails:
 - 1. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Plumb posts in each direction.

2. Expansion Joints - Provide expansion joints at the locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide a slip joint with an internal sleeve extending 2 inches beyond the joint on either side; fasten the internal sleeve securely to one side; locate joints within 6 inches of posts.
 3. Aluminum railing posts shall not be welded to base plates. All connections must utilize mechanical fasteners.
- C. Make no openings without the specific written approval of the Engineer. All re-entrant corners shall be shaped notch-free to a radius of at least ½ inch at blocks, copes, cuts and openings.

3.5 ANCHOR BOLTS

- A. Accurately locate and hold anchor bolts in place with templates at the time concrete is placed.
- B. Use sleeves for location adjustment and provide two nuts and one washer per bolt of same material as bolt.
- C. 10 degrees to clear obstruction, notify Engineer for direction on how to proceed.

3.6 FIELD QUALITY CONTROL

- A. The fact that Miscellaneous Metals work has been accepted at the shop shall not prevent its final rejection at the job site, even after it has been erected, if it is found to be defective in any way.
- B. Miscellaneous Metals erection, materials, and workmanship shall be subjected to inspection and testing in mill, shop and/or field by the Engineer.
- C. Any work found deficient shall be corrected or replaced in accordance with these specifications, without delay and at no expense to the Owner.

3.7 ADJUST AND CLEAN

- A. Touch-Up Painting - Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as approved for use for shop painting.

3.8 FASTENERS

- A. Anti-seizing Lubricant: Use on all stainless steel threads.
- B. Do not use adhesive anchors to support fire-resistive construction or where ambient temperature will exceed 120 degrees F.
- C. Provide fasteners in accordance with Data Sheet – 05500 – A, following this section, unless otherwise noted on the drawings.

DATA SHEET 05500-A
 Fastener Materials Schedule

Service Use and Location	Product	Remarks
Anchor Bolts Cast into Concrete for Equipment Bases		
All Areas	Stainless steel headed anchor bolts, unless otherwise specified with equipment	
Drilled Anchors for Metal Components to Concrete (Ladders, Handrail Posts, Electrical Panels, and other Equipment)		
Exterior and Interior Wet and Dry Areas	Hot-dip galvanized steel or stainless steel sleeve, wedge, or expansion anchors, or stainless steel adhesive anchors	Use zinc-plated undercut anchors for overhead and ceiling installations.
Submerged or Corrosive Areas	Stainless steel adhesive anchors	
Anchors in Grout-Filled Concrete Masonry Units		
All Areas	Hot-dip galvanized steel headed anchor bolts, zinc-plated or stainless steel sleeve anchors, or stainless steel adhesive anchors	
Anchors in Hollow Concrete Masonry Units		
All Areas	Zinc-plated or stainless steel sleeve anchors, or stainless steel adhesive anchors with screen tube	
Connections for Steel Fabrications and Wood Components		
All Areas	Stainless steel bolts	
All Others		
All Areas	Stainless steel fasteners	

END OF SECTION

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DIVISION 16 - ELECTRICAL

SECTION 16050

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Basic Electrical Requirements specifically applicable to Division 26 Sections
 - 2. As-Built Documentation
- B. Related Sections
 - 1. Section 16080 – Electrical Testing

1.2 REFERENCES

- A. ASCE 7-05 – Minimum Design Loads for Buildings and Other Structures
- B. International Building Code – IBC 2009
- C. Massachusetts Electrical Code
- D. Massachusetts State Building Code, 9th Edition, 780 CMR
- E. NFPA 70 - National Electrical Code
- F. NFPA 79 – Electrical Standard for Industrial Machinery
- G. ANSI/ISA-S5.4 – Instrument Loop Diagrams

1.3 SUBMITTALS

- A. Submit shop drawings, product data, and reports.
- B. Submit as-built documentation in accordance with Section 01770. I&C documentation shall conform to the latest versions of NFPA 79 and ANSI/ISA-S5.4.
- C. Submit a written warranty.
- D. Seismic restraint details including stamped certification from a professional engineer.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable Massachusetts Building Code.
- B. Electrical - Conform to Massachusetts Electrical Code. All references to the National Electrical Code or NEC in the project manual shall be construed as references to the Massachusetts Electrical Code.
- C. Conform to applicable Local Building Codes.
- D. Obtain and pay for all applicable permits.

- E. Schedule and pay for all inspections necessary for the electrical installation including but not necessarily limited to the general electrical inspection and fire department inspections.

1.5 PROJECT CONDITIONS

- A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission from the Engineer before proceeding.
- C. Location of electrical equipment, devices, and similar items, as indicated, are approximate only. Exact locations are to be determined by the Contractor during construction. If any location is different from those indicated (greater than 5 feet away from location shown on Drawings), the Engineer must give approval to the change.
- D. Verify in field, existing conditions and final locations of equipment installed under other Sections that require electrical work.
- E. Where it is necessary to core a hole through an existing concrete, the Contractor shall conduct a survey with a pachometer or by similar means to identify the location of steel reinforcing bars. The new hole shall be located so as to avoid cutting reinforcing bars. Where reinforcing steel is close enough together that it is not possible to core the required hole without cutting reinforcing bars, contact the Engineer for further direction before cutting a hole. Where reinforcing bars are cut without the consent of the Engineer, the concrete will be repaired at the expense of the Contractor.
- F. Equipment wiring
 - 1. Equipment power and control wiring is based on specific manufacturers and models. Actual wiring required may be different.
 - 2. Before pulling any power or control wire or installing conduit, obtain equipment electrical and control installation instructions and wiring diagrams. Any discrepancies from what is shown on the electrical drawings shall be brought to the attention of the Engineer. The Engineer will provide instructions for any changes that may be necessary.
 - 3. Installation of conduit or wire prior to obtaining the above specified information shall be at the Contractor's risk. The Owner will not be responsible for any extra costs related to removal or replacement of conduit or wire resulting from the failure to coordinate equipment conduit and wire requirements. In the event that additional conductors or larger conductors than shown on the Drawings are required, the Owner will not be responsible for any labor costs related to the installation of these materials unless it can be demonstrated by the Contractor to the satisfaction of the Engineer that these conductors could not have been installed at the same time as the conductors shown on the Drawings.
 - 4. Provide wiring shown on the Drawings unless specifically excluded.
- G. Drawings and Specifications
 - 1. Drawings and Specifications are typical of work done and of arrangement desired. Provide accessories and appurtenances necessary for complete installation (e.g., home

runs, conduit and wire for instrumentation and control wiring) that are required to provide a complete electrical system.

- H. As-Built Drawings: Maintain a master set of as-built drawings showing the changes and deviations from the Drawings or the approved shop drawings. Make markups as the changes are made.
- I. Where underground electric facilities are installed, measure, record, and submit as built dimensions.

1.6 WARRANTY

- A. Submit a written warranty, executed by the Contractor and manufacturer agreeing to the replacement and installation of all material, parts and adjustments required due to failure in materials or workmanship within one year from final acceptance of the Work.
- B. This warranty shall be in addition to, and not a limitation of, other rights and remedies the Owner may have against any party under the Contract Documents. This warranty is in addition to all other warranties existing under either the Contract Documents or required by Law.

1.7 SEISMIC REQUIREMENTS

- A. Components, systems and their supports shall be designed by the contractor in accordance ASCE 7-05, Section 13.6 Mechanical and Electrical Components, the International Building Code (IBC 2009), and the Massachusetts Amendments to IBC 2009.
- A. Submit details showing the seismic restraints.
- B. Submit stamped, signed certification from a Massachusetts licensed professional structural engineer that the design meets the seismic restraint requirements.

PART 2 PRODUCTS

2.1 GENERAL

- A. Products shall be Underwriter's Laboratory (UL) listed if a UL listing for that product is available.

2.2 FINAL SYSTEM DOCUMENTATION

- A. Prior to final acceptance of the system, provide operating and maintenance manuals (O&M's) covering instruction and maintenance on each type of equipment as specified.
- B. The requirements for final documentation shall be as specified.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Perform all work in accordance with OSHA (Occupational Safety and Health Administration) requirements.
- B. Perform all work in accordance with NFPA 70E, Handbook for Electrical Safety in the Workplace.

- C. Install all equipment in accordance with manufacturer's instructions and recommendations.
- D. Test all electrical components in accordance with Section 16080 and as indicated in individual electrical equipment specification sections.
- E. Perform all electrical equipment installation, checkout, and test in a safe manner. Provide the following special safety precautions, as appropriate:
 - 1. Locking and tagging procedures
 - 2. Barricades
 - 3. De-energization and/or isolation of equipment prior to testing
 - 4. Review of procedures with the Engineer and the Owner
 - 5. Erection of warning signs
 - 6. Stationing of guards and watchmen
 - 7. Maintenance of voice communications
 - 8. Personnel orientation
- F. Do not install electrical equipment in its permanent location until structures are weather-tight or equipment is properly protected from the weather.
- G. Before energizing any machine, visually inspect for serviceability. Verify that equipment and machines have been properly lubricated and aligned. Verify nameplate for electrical power requirements.

END OF SECTION

SECTION 16060

GROUNDING AND BONDING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Electrical equipment and raceway grounding and bonding
 - 2. Grounding of POLE and other conductive equipment
- B. Related Sections
 - 1. Section 16080 – Electrical Testing

1.2 REFERENCES

- A. NFPA 70 – National Electrical Code

1.3 SYSTEM DESCRIPTION

- A. Grounding electrode system shall be installed for each lighting pole. It shall include a driven ground rod with a bonded grounding conductor at each pole location.
- B. Bond together exposed non-current carrying metal parts of electrical equipment, metal raceway systems, and grounding conductor in raceways and cables.
- C. Install grounding in accordance with NEC Article 250.

1.4 SUBMITTALS

- A. Submit shop drawings, product data, and reports.
- B. Indicate layout of ground rods, location of system grounding electrode connections, and routing of grounding electrode conductor.
- C. Submit ground resistance testing reports in accordance with Section 16080.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Grounding Electrode Conductors – medium-hard drawn bare copper
- B. Grounding Conductors - insulated copper, minimum size #12 AWG and in accordance with NEC Tables 250.66, 250.102(C)(1) and 250.122, or larger if so indicated on the Drawings
- C. Ground Rods: Copper-clad steel, ¾ inch diameter, minimum length 10 feet

PART 3 EXECUTION

3.1 INSTALLATION

- A. Provide a separate, insulated equipment grounding conductor with each feeder and branch circuit. Terminate each end on a grounding lug, bus, or bushing.

- B. Use a minimum of #8 AWG copper wire to ground all piping, tanks, handrails and other conductive equipment or structures including ductwork and floor gratings.
- C. Use cadweld, thermweld or brazed type ground connections for the grounding electrode system: cable to cable, cable to ground rod and cable to metallic pole steel and reinforcing steel connections.
- D. Drive ground rods one foot below finished grade.

3.2 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation and compliance with NEC Article 250.

3.3 TESTING

- A. Perform ground tests using a low resistance, Null balance type, ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.
- B. Test the ground rods and measure ground resistance. Submit tabulation of results to the Engineer. Include identification of electrodes, date of reading and ground resistance value in the test reports. If the resistance is not 5 ohms or less, contact the Engineer. The Engineer will initiate design changes, if necessary, to obtain acceptable values of ground resistance.
- C. Ground resistance of conduits, equipment cases, and supporting frames, shall not vary from that of system as a whole and shall not exceed 0.5 ohms to ground. Measure resistance to ground of representative items, as directed by the Engineer. Submit all readings to the Engineer.

END OF SECTION

SECTION 16075

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Wire and cable markers

1.2 REFERENCES

- A. NEMA WC5 - Thermoplastics - Insulated Wire and Cable for Transmission and Distribution of Electrical Energy
- B. ANSI C57

1.3 SUBMITTALS

- A. Provide schedule for nameplates.

PART 2 PRODUCTS

2.1 WIRE AND CABLE MARKERS

- A. Wires up to AWG10: Split sleeve or tubing type waterproof markers (Thomas & Betts, Panduit, Burndy, Sur-Code Sleeve Markers or equal).
- B. Wires AWG8 and larger: Plastic impregnated cloth markers, resistant to abrasion, moisture, dirt and oil (Ideal, Panduit, Brady or equal).

PART 3 EXECUTION

3.1 INSTALLATION

- A. Embossed tape will not be permitted for any application.

3.2 WIRE IDENTIFICATION

- A. Provide wire markers on each end of each conductor in panelboard gutters, pull boxes, outlet and junction boxes, switchgear, switchboards, motor control centers, control panels, at each load connection and at each terminal board connection. Identify with branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on equipment manufacturer's shop drawings for control wiring.
- B. Circuits passing through junction boxes shall be individually grouped and bound with Ty-raps.
- C. Include the following color coding of all conductors used for power or lighting circuits.
 - 1. 120/240 volt, single phase 3 wire
 - a. Black - Phase A
 - b. Red - Phase B

- c. White - Neutral
 - d. Green - Equipment ground
- 2. 120/208 volt, three phase 4 wire
 - a. Black - Phase A
 - b. Red - Phase B
 - c. Blue - Phase C
 - d. White - Neutral
 - e. Green - Equipment ground
- D. Color coding of multiconductor control cables shall be in accordance with NEMA Standard WC5.
- E. Branch circuit equipment grounding conductors smaller than #8 shall have a green jacket, **green tape is not acceptable.** (i.e. #8 THHN)

END OF SECTION

SECTION 16080

ELECTRICAL TESTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Testing of Electrical Systems - General
 - 2. Electrical Test Equipment
 - 3. Electrical Test Procedures
 - 4. Specific Electrical Tests
- B. Related Sections
 - 1. Section 16060 – Grounding and Bonding
 - 2. Section 16075 – Electrical Identification

1.2 REFERENCES

- A. Massachusetts Electrical Code
- B. ANSI C37

1.3 SUBMITTALS

- A. General: Testing shall be performed, with satisfactory results, prior to connecting and energizing equipment. Problems discovered as a result of testing shall be corrected and retesting performed prior to connecting and energizing equipment.
- B. The following test reports shall be submitted
 - 1. Wire and cable continuity test results
 - 2. Grounding system test results

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 TESTING OF ELECTRICAL SYSTEMS - GENERAL

- A. Provide supervision, labor, materials, tools, test instruments and other equipment or services and expenses required to test, adjust, set, calibrate, and operationally check work and components of the various electrical and control systems and circuitry throughout the contract.
- B. Pay for all tests specified in Division 16, including expenses incident to re-tests occasioned by defects and failures of equipment to meet specifications. Unless otherwise specified, the Owner will supply the electric current necessary for tests.
- C. After completion of testing replace wiring and equipment found defective (defined as failing to meet specified requirements).

- D. Do not void equipment warranties or guarantees by testing and checkout work. Checks and tests shall be supplemental to and compatible with the manufacturer's installation instructions. Where deviations are apparent, obtain the manufacturer's approved review of procedure prior to testing. Where any repairs, modifications, adjustments, tests or checks are to be made, contact the Engineer to determine if the work should be performed by or with the manufacturer's representative. All checks and tests specified for proper operating and safety of equipment and personnel are to be performed concurrent with progression of the work, prior to final acceptance by the Owner.
- E. At any stage of construction and when observed, any electrical equipment or system determined to be damaged, or faulty, is to be reported to the Engineer. Corrective action requires Engineer's approval prior to re-testing, and inspection.
- F. Prior to testing and start-up, equipment and wiring shall be properly and permanently identified with nameplates, and other identification as specified in Section 16075. Check and tighten terminals and connection points, remove shipping blocks and thoroughly clean equipment, repair damaged or scratched finishes, inspect for broken and missing parts and review and collect manufacturer's drawings and instructions for delivery to the Engineer. Make routine checks and tests as the job progresses to ensure that wiring and equipment is properly installed.
- G. Testing and checkout work is to be performed with fully qualified personnel skilled in the particular tests being conducted. Personnel are to have at least 5 years of experience with tests of same type and size as specified.
- H. Conduct tests in presence of the Engineer. Notification is required 7 calendar days or more in advance when any test is to be performed, and do not start tests without approval.
- I. Make openings in circuits for test instruments and place and connect instruments, equipment, and devices, required for the tests. Upon completion of tests, remove instruments and instrument connections and restore circuits to permanent conditions.
- J. Identify test being performed, conductor or equipment the test is being performed on, date the test was performed, value of test results, person performing the test, the witness to the test, and the serial and model number and description of test instrument. Arrange information in tabular form and submit to the Engineer for approval.
- K. When the electrical tests and inspections specified or required within Division 16 are complete and results reported, reviewed, and approved, that portion of the electrical equipment system or installation may be considered electrically complete. Affix appropriate, approved, and dated completion or calibration labels to the tested equipment and notify the Engineer of electrical completion. If the Engineer finds completed work unacceptable, he will notify the Contractor in writing of unfinished or deficient work, with the reason for his rejection, to be corrected by the Contractor. The Contractor will notify the Engineer in writing when exceptions have been corrected. The Contractor will prepare a "notification of Substantial Electrical Completion" for approval by the Engineer following the Engineer's acceptance of electrical completion. If later in-service operation or further testing identifies problems attributable to the Contractor, these will be corrected.

3.2 ELECTRICAL TEST EQUIPMENT

- A. Test equipment used is to be inspected and calibrated.
- B. Perform calibration and setting checks with calibrated test instruments of at least twice that of the accuracy of the equipment, device, relay or meter under test. Dated calibration labels shall be visible on test equipment. Calibrations over 6 months old are not acceptable on field test instruments. Inspect test instruments for proper operation prior to proceeding with the tests.
- C. Perform ground tests using a low resistance, Null balance type, ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.

3.3 TEST PROCEDURES

- A. Prepare procedures and schedules for the work specified herein. This work is to be coordinated and compatible with both the work and schedule of the other crafts. Sequence the tests and checks so that the equipment can be energized immediately after the completion of the application tests.
- B. The test procedures shall provide specific instructions for the checking and testing of each electrical component of each system. Schedule tests and inspections as the job progresses.
- C. Testing and checkout work shall be conducted in a safe manner. Provide the following special safety precautions, as appropriate:
 - 1. Locking and tagging procedures
 - 2. Barricades
 - 3. Deenergization and/or isolation of equipment prior to testing
 - 4. Review of procedures with the Engineer and Resident Project Representative
 - 5. Erection of warning signs
 - 6. Stationing of guards and watchmen
 - 7. Maintenance of voice communications
 - 8. Personnel orientation
- D. Before energizing any equipment, visually inspect for serviceability. Check manufacturer's instruction manual.
- E. Where ground test results identify the need for additional grounding conductors or rods that are not indicated or specified, design changes will be initiated to obtain the acceptable values.

3.4 SPECIFIC ELECTRICAL TESTS

- A. Wire and Cable
 - 1. Continuity test each control wire and cable to verify the field applied tag per conductor and record results.
- B. Grounding Systems

1. Test in accordance with Section 16060.

END OF SECTION

SECTION 16120

CONDUCTORS AND CABLE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Building wire and cable
 - 2. Wire connectors
- B. Related Sections
 - 1. Section 16075 – Electrical Identification

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code

1.3 SUBMITTALS

- A. Submit shop drawings, product data and reports.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.5 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions. Determine required separation between cable and other work.
- C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required. Determine cable routing to avoid interference with other work.

PART 2 PRODUCTS

2.1 BUILDING WIRE AND CABLE

- A. Description: Stranded conductor insulated wire, multi-conductor control cable and tray cable.
- B. Conductor: copper
- C. Insulation Voltage Rating: 600 volts
- D. Insulation: ANSI/NFPA 70; Type XHHN insulation for branch circuits, and underground power wiring AWG 10 and smaller.
- E. Manufacturer

1. Okonite Co.
2. Rome Cable Corp.
3. American Insulated Wire Corp.
4. Southwire
5. or equal

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Minimum size for power wiring shall be AWG #12.
- B. All wiring shall be run in conduit, unless otherwise noted.
- C. Install products in accordance with manufacturers instructions.
- D. Use stranded conductors for all wire sizes.
- E. In raceways, mechanically complete the installation in all details. Pull all conductors into raceway at same time.
- F. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- G. Protect exposed cable from damage.
- H. Use suitable cable fittings and connectors.
- I. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- J. Clean conductor surfaces before installing lugs and connectors.
- K. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- L. For underground splices and splices called out as or required to be submersible, use adhesive-lined heat shrink type splice kits rated for submersion.
- M. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 16075.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.5 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage and proper connection.
- B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- C. Verify continuity of each branch circuit conductor.

END OF SECTION

SECTION 16131

CONDUIT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Non-metallic (PVC) conduit
 - 2. Underground warning tape
 - 3. Conduit expansion joint
 - 4. Conduit sealing bushing
- B. Related Sections
 - 1. Section 16060, Grounding and Bonding

1.2 REFERENCES

- A. ACI 318 – Building Code Requirements for Structural Concrete
- B. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
- C. ANSI/NFPA 70 - National Electric Code
- D. NEMA TC 2 - Electrical Plastic Tubing (EPT)
- E. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit

1.3 SUBMITTALS

- A. Shop drawings, product data and reports
- B. Riser Diagrams for the electrical installation

1.4 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept conduit on site. Inspect for damage.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- C. Protect PVC conduit from sunlight.

1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.

- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.
- D. Provide complete conduit systems between electrical equipment and devices as required.

PART 2 PRODUCTS

2.1 GENERAL CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4 inch unless otherwise specified
- B. For underground installations: Use schedule 40 PVC
- C. For exposed outdoor locations: Use rigid steel conduit

2.2 RIGID STEEL CONDUIT

- A. Rigid Steel Conduit: ANSI C80.1
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; all steel fittings

2.3 NONMETALLIC (PVC) CONDUIT

- A. Description: NEMA TC 2; Schedule 40 PVC
- B. Fittings: NEMA TC3

2.4 UNDERGROUND WARNING TAPE, DETECTABLE

- A. Warning tape for all buried electrical conduit shall be solid aluminum foil core tape and printed with the words "CAUTION - BURIED ELECTRICAL LINE BELOW."
- B. Tape shall be red and 6 inches wide.
- C. Manufacturers
 - 1. Ideal
 - 2. or equal

2.5 FITTINGS AND CONDUIT BODIES

- A. Fittings
 - 1. Description - Threaded, malleable Iron or schedule 40 PVC. Material to correspond with type of conduit system being used
- B. Conduit Bodies
 - 1. Manufacturer
 - a. Appleton-Type Mogul - malleable iron
 - b. Equal by O-Z Gedney
 - c. Equal by Crouse-Hinds
 - d. or equal
- C. Conduit Hubs

1. Manufacturer
 - a. Crouse Hinds – Myers hub Type HUB
 - 1) Zinc in damp and wet locations
 - b. Equal by O-Z Gedney
 - c. Equal by RACO
 - d. Equal by Appleton
 - e. or equal

2.6 CONDUIT EXPANSION JOINT, RIGID METAL CONDUIT

- A. Weather tight, internal ground, expansion joint for galvanized rigid steel conduit, 4 inch maximum conduit movement
- B. Manufacturer
 1. Crouse-Hinds Type XJG
 2. Appleton Type XJ
 3. O-Z Gedney Type AX
 4. or equal

2.7 CONDUIT EXPANSION FITTING, PVC

- A. Expansion fitting for PVC conduit shall compensate for length changes due to temperature variations in exposed conduit runs, 4-inch maximum conduit movement.
- B. Manufacturer
 1. Carlon
 2. or equal

2.8 CONDUIT SEALING BUSHING

- A. Description: Bushing that provides a waterproof seal around wire and cables in a conduit
- B. Construction: Slotted P steel discs, neoprene sealing ring and stainless steel head cap screws and washers
- C. Manufacturer
 1. O-Z Gedney Type CSBI

2.9 COLD GALVANIZING COMPOUND

- A. Cold galvanizing compound shall be applied to all field threads and shall be as manufactured by ZRC Products Company, a division of Norfolk Corp. or equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Junction boxes shown on the Drawings shall be provided in locations indicated. Additional boxes shall be provided as needed to comply with NFPA 70 requirements.
- B. Install conduit in accordance with NECA "Standards of Installation."
- C. Install in accordance with manufacturer's instructions.
- D. Arrange supports to prevent misalignment during wiring installation.
- E. Group related conduits; support using conduit rack. Construct rack using support channel; provide space on each for 25 percent additional conduits.
- F. Route conduit in and underground from point-to-point unless drawings indicate otherwise.
- G. Cross conduits in slab only with the Engineer's approval.
- H. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- I. Before installation of wires and cables, clean and dry inside of each conduit run.
- J. For galvanized conduit, apply cold galvanizing compound to all field threads.
- K. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fittings. Allow joint to cure for 20 minutes, minimum.
- L. Use conduit hubs to fasten conduit to boxes and control panels in damp and wet locations. For wet and corrosive locations, use stainless steel or non metallic conduit hubs.
- M. Install no more than equivalent of three 90° bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch size.
- N. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- O. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.
- P. Provide 100-lb. test nylon pull string in each conduit 2 inch or larger except sleeves and nipples.
- Q. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- R. Ground and bond conduit in accordance with Section 16060.
- S. Install rigid metal conduit using only threaded fittings.
- T. Use two locknuts, one inside and one outside of each box and enclosure when enclosure ratings are NEMA 1 or 12.
- U. Arrange for all duct bank systems to drain away from buildings. Install duct bank systems to drain toward manholes or handholes.
- V. Provide thru wall seals on all conduits passing through foundation walls.

- W. Use PVC conduit fittings and bodies with PVC conduit.
- X. Install underground warning tape 12 inches above all underground conduits.
- Y. Install underground conduit with minimum cover, in accordance with National Electric Code or utility requirements, but no less than 36 inches.
- Z. For non-concrete encased underground conduit installations, backfill the trench with sand borrow for the full width of the trench and extend the sand borrow 12-inches over the conduit.
- AA. Provide conduit expansion joints for underground conduits that enter a building through an exterior wall or connect to an exterior mounted disconnect switch, meter, or other equipment.
- BB. Size and spacing of conduits embedded in concrete slabs shall be per ACI 318, including the following:
 - 1. Conduits embedded in concrete slabs or walls shall not be larger in outside diameter than one-third of the overall thickness of the slab or wall in which they are embedded.
 - 2. Conduits embedded in concrete slabs or walls shall not be spaced closer than three conduit diameters on center.

END OF SECTION

SECTION 16138

DUCT BANKS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Handholes
 - 2. Installation of duct banks
 - 3. Installation of handholes

1.2 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated
- B. ANSI/NEMA FB1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
- C. ANSI/SCTE 77-2007 - Specification for Underground Enclosure Integrity

1.3 SUBMITTALS

- A. Manufacturer's shop drawings
- B. Project data

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 5 years documented experience.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Accept conduit on site. Inspect for damage.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of duct bank prior to excavation for rough-in.
- C. Duct bank routing is shown on Drawings in approximate locations unless dimensions are indicated. Route as required to complete duct system.

PART 2 PRODUCTS

2.1 NONMETALLIC CONDUIT

A. Description: NEMA TC-2 Schedule 40 PVC.

B. Fittings: NEMA TC-3.

2.2 POLYMER CONCRETE HANDHOLES

A. Description

1. Material shall be a polyester resin in combination with selectively graded aggregates.
2. Material shall be resistant to ultraviolet light and unaffected by moisture and freezing.
3. Loading – Designed to meet ANSI/SCTE 77-2007 requirements for Tier 8 (12,000 lbs) applications.
4. Dimensions – as required, or as indicated on the Drawings.
5. Lid shall be provided by same manufacturer.
6. Any and all hardware required shall be stainless steel.
7. Cover markings – “ELECTRIC”, “TELEPHONE”, “COMMUNICATIONS”, as appropriate

B. Manufacturers

1. Quazite - Composolite
2. Newbasis
3. or equal

2.3 ACCESSORIES

A. Duct Bank Spacers

1. Type: Nonmetallic, interlocking, for multiple conduit sizes.
2. Suitable for all types of conduit.
3. Manufacturers
 - a. Underground Device, Inc.
 - b. Carlon.

B. Identification Devices

1. Raceway Tags
 - a. Material: Permanent, nylon or polyethylene.
 - b. Shape: Round.
 - c. Raceway Designation: Pressure stamped, embossed, or engraved.
 - d. Tapes relying on adhesives or taped-on markers not permitted.

PART 3 EXECUTION

3.1 DUCT BANK INSTALLATION

- A. Use Schedule 40 PVC conduit for all underground duct banks.
- B. Install duct in accordance with manufacturer's instructions.
- C. Install duct to locate top of duct bank at depths as indicated on drawings (or at 36 inches below grade depths not indicated on drawings).
- D. Install duct with minimum slope of 1.5 inches per 100 feet. Slope duct away from building entrances.
- E. Cut duct square using saw or pipe cutter; de-burr cut ends.
- F. Insert duct to shoulder of fittings; fasten securely.
- G. Join nonmetallic duct using adhesive as recommended by manufacturer.
- H. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- I. Install no more than equivalent of three 90 degree bends between pull points.
- J. Provide suitable fittings to accommodate expansion and deflection where required.
- K. Terminate duct at handhole entries using end bell.
- L. Stagger duct joints vertically in concrete encasement 6 inches minimum.
- M. Use suitable separators and chairs installed not greater than 4 feet on centers.
- N. Band ducts together before placing concrete.
- O. Securely anchor duct to prevent movement during concrete placement.
- P. Provide the following:
 - 1. Poured in place concrete in accordance with the specifications
 - 2. Minimum 3 inch concrete cover at bottom, top, and sides of duct bank.
 - 3. Two No. 4 steel reinforcing bars in top of bank under paved areas.
 - 4. Connect to existing concrete encasement using dowels.
 - 5. Excavation, backfill and compaction of trenches under provisions of the specifications
- Q. Provide suitable pull string in each empty duct except sleeves and nipples.
- R. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.

3.2 PREPARATION FOR INSTALLATION OF HANDHOLES

- A. Contractor shall provide excavation, installation of base material, and compaction of base material in accordance with the specifications.

3.3 INSTALLATION – POLYMER CONCRETE HANDHOLES

- A. Install and seal sections in accordance with manufacturer's instructions.
- B. Install handholes plumb.
- C. Set the top of each handhole to finished grade.

3.4 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of exact routing of duct bank.
- B. Accurately record actual locations of each manhole and each handhole.

END OF SECTION

SECTION 16520

EXTERIOR LUMINAIRES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Exterior luminaires and accessories
 - 2. Poles

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.
- B. ANSI/IES RP-8 - Recommended Practice for Roadway Lighting.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate dimensions and components for each luminaire and pole.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years experience.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. and testing firm acceptable to authority having jurisdiction.

1.6 COORDINATION

- A. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

1.7 SPARE PARTS

- A. Provide 1 of each lamp type and wattage installed.

PART 2 PRODUCTS

2.1 LUMINAIRES SCHEDULE

- A. Refer to drawing lighting fixture schedule

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine excavation and concrete foundation for lighting poles.
- B. Examine each luminaire to determine suitability for lamps specified.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install lighting poles at locations indicated.
- C. Install poles plumb. Double nuts to adjust plumb. Grout around each base.
- D. Install lamps in each luminaire.
- E. Bond luminaires, metal accessories and metal poles to branch circuit equipment grounding conductor. Provide supplementary grounding electrode at each pole for luminaires.

3.3 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for improper connections and operation.
- B. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

3.4 ADJUSTING

- A. Aim and adjust luminaires to provide illumination levels and distribution as directed.
- B. Relamp luminaires which have failed lamps at Date of Substantial Completion.

3.5 CLEANING

- A. Clean electrical parts to remove conductive and deleterious metals.
- B. Remove dirt and debris from enclosure.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

END OF SECTION